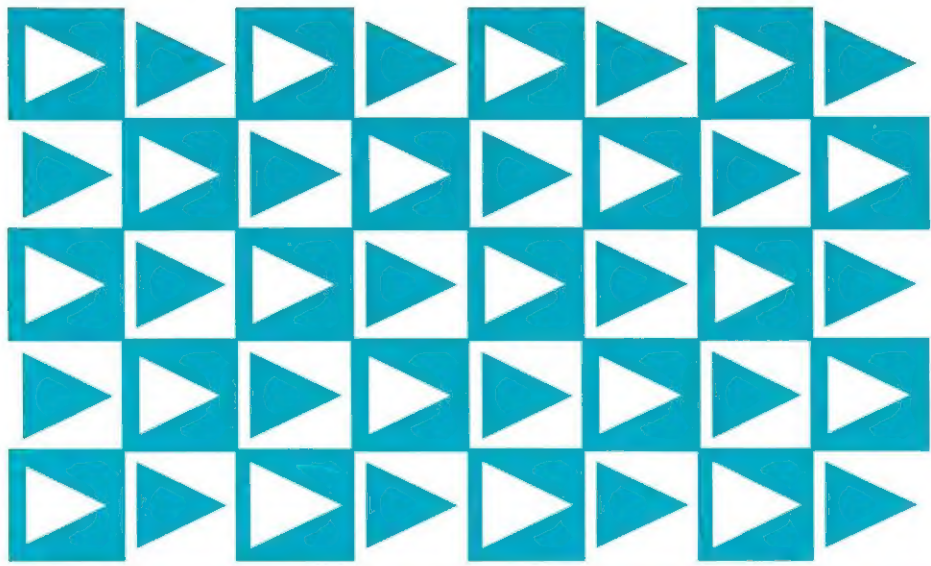
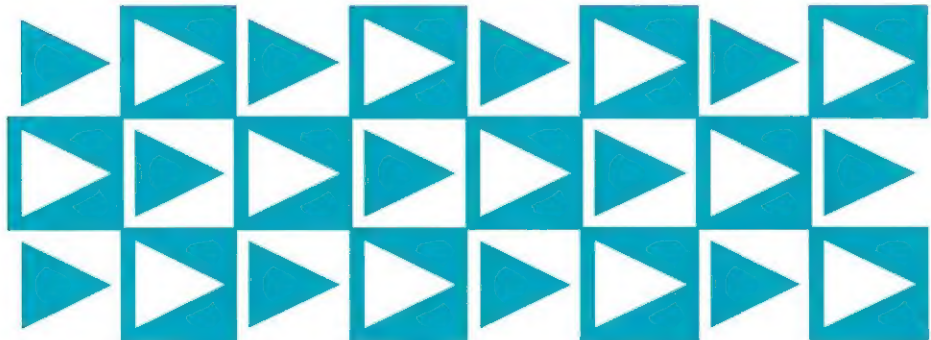


1992 SHORT FORM DESIGNERS' GUIDE



NEW PRODUCT UPDATE INCLUDING ALL PRODUCTS
FROM PRECISION MONOLITHICS DIVISION



DATA CONVERTERS • AMPLIFIERS • ANALOG SIGNAL
PROCESSING • TRANSDUCERS • AUDIO/VIDEO COMPONENTS •
DISK DRIVE COMPONENTS • AUTOMOTIVE COMPONENTS •
COMMUNICATIONS COMPONENTS • ATE COMPONENTS •
VOLTAGE REFERENCES • SWITCHES AND MULTIPLEXERS •
DATA ACQUISITION SUBSYSTEMS • DIGITAL SIGNAL
PROCESSING



1992 SHORT FORM DESIGNERS' GUIDE

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1992 SHORT FORM DESIGNERS' GUIDE

This designers' guide serves as an update to the selection guides in the most recently released reference manuals. It also provides the most current data on specifications and prices as well as the descriptions and block diagrams for many new products.

This guide is intended to make it easy for users and potential users to become aware of, consider and compare products and product families available from Analog Devices as possible solutions to measurement and control, signal processing and system design problems. Once having arrived at preliminary choices, the user can look up complete information on the products in our reference manuals, or else obtain data sheets on newer products by dropping a card in the mail or making a phone call to one of our sales offices (pages 132 and 133) or to our literature distribution center in Norwood, Massachusetts (617) 461-3392.

This book contains:

- Selection trees to aid the designer in the initial selection stage
- Selection guides and characteristics tables for comparing features, specifications and pricing for all products that are recommended for new designs, including products from our PMI division
- A comprehensive index to all products
- New product descriptions, specifications and block diagrams
- A list of products still in production but not listed in the primary tables because they are not recommended for new designs

- A list of products no longer available
- A list of products available to various military standards
- A description of our Application Specific Integrated Circuit capability
- Worldwide customer sales directory

PRODUCT REFERENCE MANUALS

Analog Devices has recently published a complete set of reference manuals which contain the data sheets and additional technical information on all of our current products. The products in these reference manuals cover the entire range of data acquisition and signal processing requirements. If you have not already received a set of these reference manuals, they can be obtained by contacting our main offices or one of our sales offices.

HOW TO USE THIS BOOK

This Volume

This volume is intended to lead the designer to the optimum component to fit a given application with the right mix of performance, features and cost, while also providing up-to-date information on new products. It is to be used in conjunction with our most recent reference manuals and detailed data sheets, and provides source references for more detail.

If You Know the Product Number

Please turn to the product number index on page 134. This will lead you to the selection chart which contains that product and will allow you to compare it with other similar products. The selection chart will also tell you where more detailed data is available.

If You Don't Have a Product Number

If you have a product requirement, start with the table of contents; this will lead you to the proper selection trees and selection guides of that product class. These charts will quickly direct you to the product best fitting your specification needs.

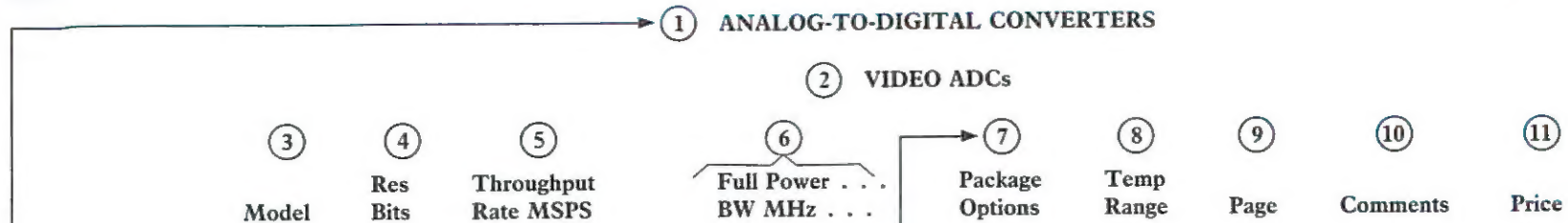
If You Can't Find It Here . . . Ask!

This book contains all available products from Analog Devices through releases of the First Quarter of 1992. If you have a product number which is not listed, or if you have a performance requirement which does not seem to be met in the selection guides, please call your nearest sales office or Analog Devices at (617) 937-1428. If you would like a data sheet on a specific product or our complete catalog, call (617) 461-3392.



Selection Guide Organization

(Example)



- ① Major product area heading.
- ② Secondary product area heading (a product may be found in more than one area).
- ③ Generic part number (without suffixes for performance grades or packages).
- ④ Primary specification (first sort criterion).
- ⑤ Secondary sort specification.
- ⑥ Other key specifications. All specifications are min or max unless noted as typical.
- ⑦ Package options—product available in these package styles.
- ⑧ Temperature ranges available—C = Commercial 0 to +70°C; I = Industrial -40°C to +85°C (some products -25°C to +85°C); M = Military -55°C to +125°C.
- ⑨ Page—Letter designation indicates the appropriate product databook in which complete data sheet information can be found. AV = *A/V Reference Manual*; CI = *Data Converter Reference Manual, Volume I*; CII = *Data Converter Reference Manual, Volume II*; L = *Linear Products Databook*; and P = *Precision Monolithics Division Databook*. D = design-in products not contained in databooks, but data sheets are available. Contact your nearest sales office for data sheets on any of the above.
- ⑩ Additional comments on features or applications.
- ⑪ Price—the 100-piece price currently charged customers ordering directly from Analog Devices (minimum order \$500). Pricing on orders placed through our franchised distributors may be at a different level. All prices are subject to change without notice.

Note that products are listed by generic part number only, such as AD9002, without additional suffixes for performance grade and package style (e.g., AD9002AD). In cases where product grades have differing values for a given specification, the range for all grades is given. The individual product data sheets provide the detail specifications on the actual models available, as well as complete ordering information.

PACKAGE OPTIONS

- 1 Hermetic DIP, Ceramic or Metal
- 2 Plastic or Epoxy Sealed DIP
- 3 Cerdip
- 4 Ceramic Leadless Chip Carrier
- 5 Plastic Leaded Chip Carrier
- 6 Small Outline "SOIC" Package
- 7 Hermetic Metal Can
- 8 Hermetic Metal Can DIP
- 9 Ceramic Flatpack
- 10 Plastic Quad Flatpack
- 11 Single-in-Line "SIP" Package
- 12 Ceramic Leaded Chip Carrier
- 13 Nonhermetic Ceramic/Glass DIP
- 14 J-Leaded Ceramic Package
- 15 Ceramic Pin Grid Array
- 16 TO-92
- 17 Plastic Pin Grid Array

BOLDFACE TYPE

Boldface entries indicate products recommended for new design.

ASTERISK

*Denotes new product since the publication of the most recent databook.

Analog Devices designs, manufactures and sells worldwide sophisticated electronic components and sub-systems for use in real-world signal processing. More than six hundred standard products are produced in manufacturing facilities located throughout the world. These facilities encompass all relevant technologies, including several embodiments of CMOS, BiMOS, bipolar and hybrid integrated circuits, each optimized for specific attributes—and assembled products in the form of potted modules, printed-circuit boards and instrument packages.

State-of-the-art technologies have been utilized (and in many cases invented) to provide timely, reliable, easy-to-use advanced designs at realistic prices. Our popular IC products are available in both conventional and surface mount packages (SOIC, LCC, PLCC), and many of our assembled products employ surface mount technology to reduce manufacturing costs and overall size. A quarter century of successful applications experience and continuing vertical integration insure that these products are oriented to user needs. The ongoing application of today's state-of-the-art and the invention of tomorrow's state-of-the-art processes strengthen the leadership position of Analog Devices in standard data acquisition and signal processing products and make us a strong contender in high performance, mixed-signal ASICs.

NEW PRODUCTS FOR 1992

Analog Devices has made significant investments in the past few years to develop major new process and design technologies which have allowed us to expand our product lines extensively into many new areas such as video displays, digital audio, disk drive data retrieval, automotive, and telecommunications. These new capabilities have also allowed us to offer higher performance and lower cost products in our traditional data acquisition and signal processing lines. They are all classified and summarized in this Guide, along with existing products which are suitable for new designs. New products will be marked with an "*" in the listings.

The primary thrust for new products is in the very high speed and video areas with fast new DACs, ADCs and amplifiers directed primarily at display, signal pro-

cessing, radar, ATE, disk drive, communications and automotive applications. Our DSP offerings have been enhanced greatly by the ADSP-21020 floating-point processor. Automotive products like the AD22001 lamp monitor are already in production in automobiles, while the new ADXL50 micromachined accelerometer is a breakthrough for airbag systems and active suspension.

TECHNICAL SUPPORT

Our extensive technical literature discusses the technology and applications of products for precision measurement and control and dynamic signal processing. In addition to tutorial material and comprehensive data sheets, we offer application notes, application guides, technical handbooks and several serial publications; for example, *Analog Productlog* provides brief information on new products being introduced, and *Analog Dialogue*, our technical magazine, provides in-depth discussions of new developments in analog and digital circuit technology as applied to data acquisition, signal processing, control and test. In addition to the Reference Manuals and general short form selection guides such as this one, we also publish several short form catalogs on specific product families. Analog Devices also provides in-depth technical support through our sales offices and with a network of applications engineers available at our factory locations to discuss our products and your applications. A call to our central office in Norwood, Massachusetts will be directed to the engineer most closely associated with your interests.

SALES OFFICES

Backing up our design and manufacturing capabilities and our extensive array of publications is a network of sales offices, representatives and distributors throughout the United States and most of the world. They are staffed by experienced sales and applications engineers, and many of them maintain a local stock of Analog Devices products. Our Worldwide Sales Directory, as of the publication date, appears on the last two pages of this section.

RELIABILITY

The manufacture of reliable products is a key objective at Analog Devices. The primary focus is the company-wide Quality Improvement Process (QIP). In addition, we maintain facilities that have been qualified under

such standards as MIL-M-38510 (Class B and Class S) for ICs in the U.S. and MIL-STD-1772 for hybrids. Many of our products—both proprietary and second-source—have qualified for JAN part numbers; others are in the process. A larger number of products—including many of the newer ones just starting the JAN qualification process—are specifically characterized on Standard Military Drawings (SMDs). Most of our ICs are available in versions that comply with MIL-STD-883C Class B, and many also comply with Class S. We publish a *Military Products Databook* for designers who specify ICs and hybrids for military contracts. The 1990 issue consists of two volumes with data on 343 product families; the 120 entries in the second of those volumes describe qualified products manufactured by our PMI Division. A newsletter, *Analog Briefings*®, provides current information about the status of reliability at ADI.

Our PLUS program makes available standard devices (commercial and industrial grades, plastic or ceramic packaging) for *any* user with demanding application environments. Subjected to stringent screening, similar to MIL-STD-883 test methods, these devices are suffixed "/+" and are available from stock.

PRODUCTS NOT FOUND IN THE SELECTION GUIDES

For maximum usefulness to designers of new equipment, we have limited the contents of selection guides to products most likely to be used for the design of new circuits and systems. If the model number of a product you are interested in is not in the selection guides, turn to page 124 at the back of this volume where you will find a list of older products for which data sheets are available upon request. On page 125 you will find a guide to substitutions for products no longer available.

PRICES

Accurate, up-to-date prices are an important consideration in making a choice among the many available product families. Since prices are subject to change, current price lists and/or quotations are available upon request from our sales offices.

Analog Briefings is a registered trademark of Analog Devices, Inc.

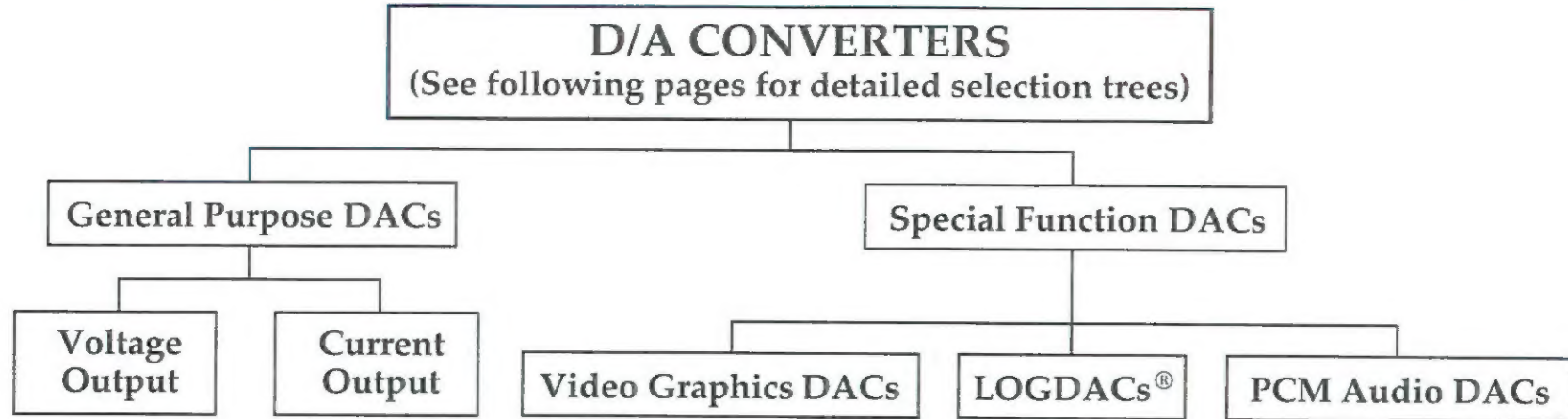
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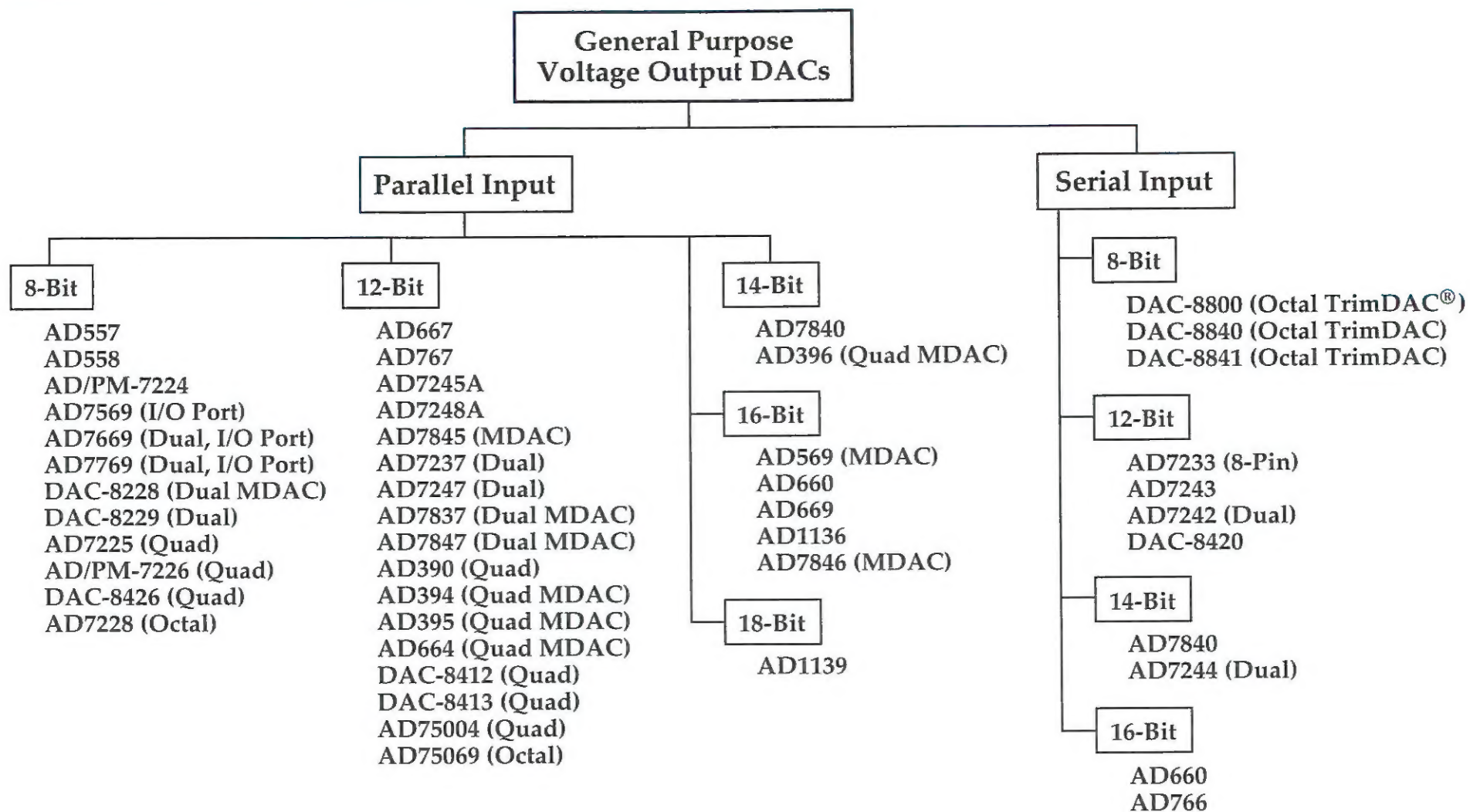
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Selection Trees

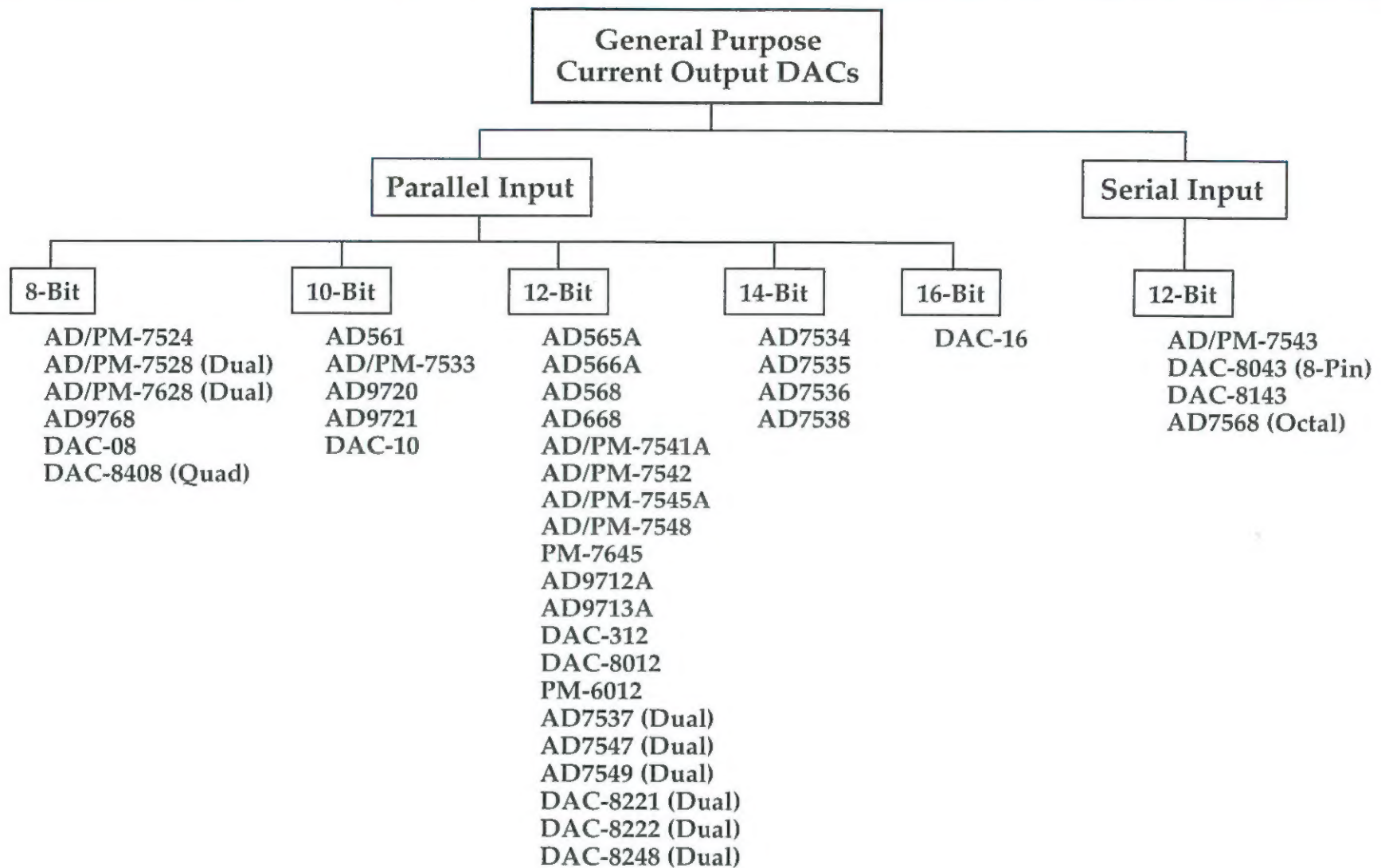


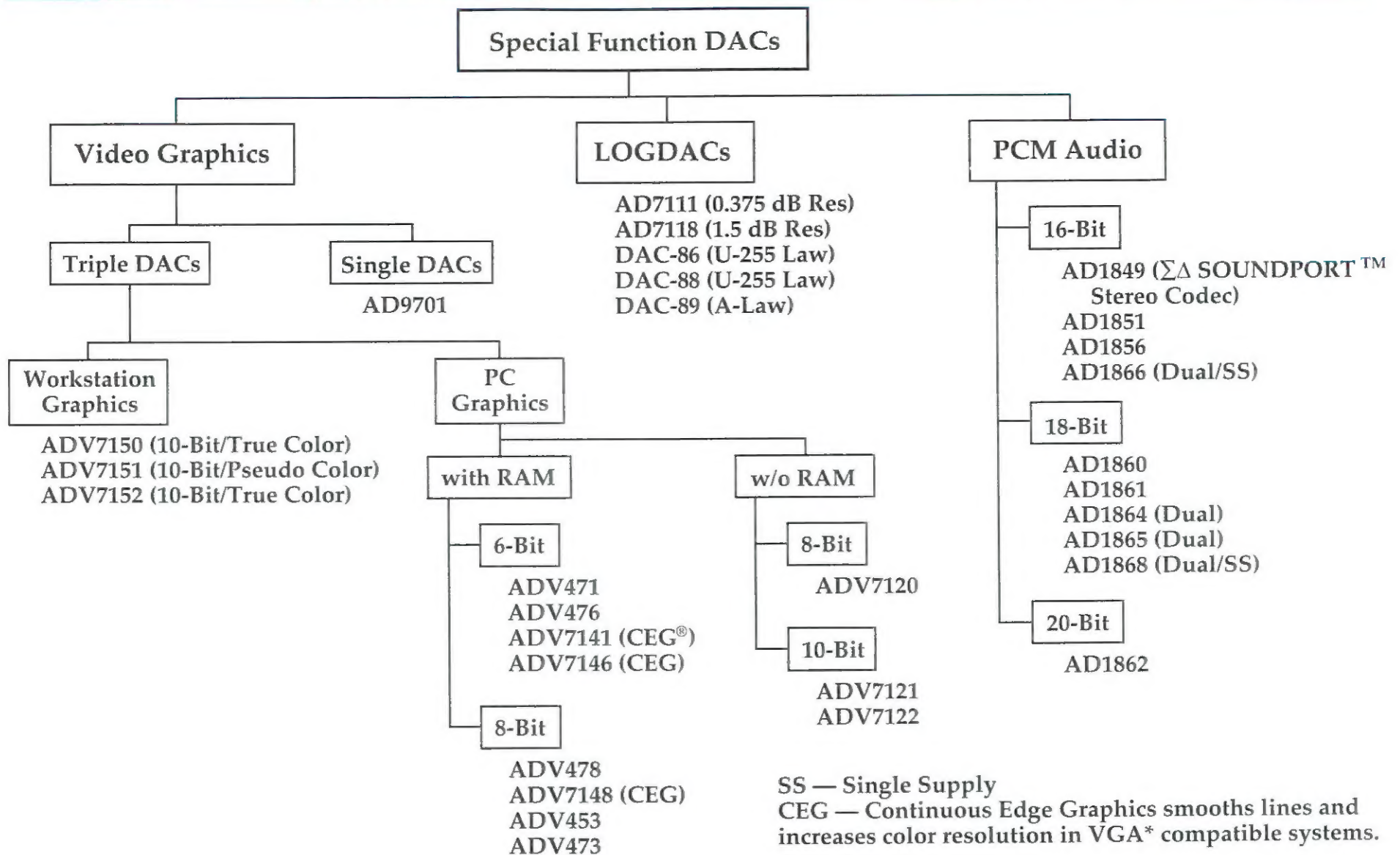
LOGDAC is a registered trademark of Analog Devices, Inc.



TrimDAC is a registered trademark of Analog Devices, Inc.

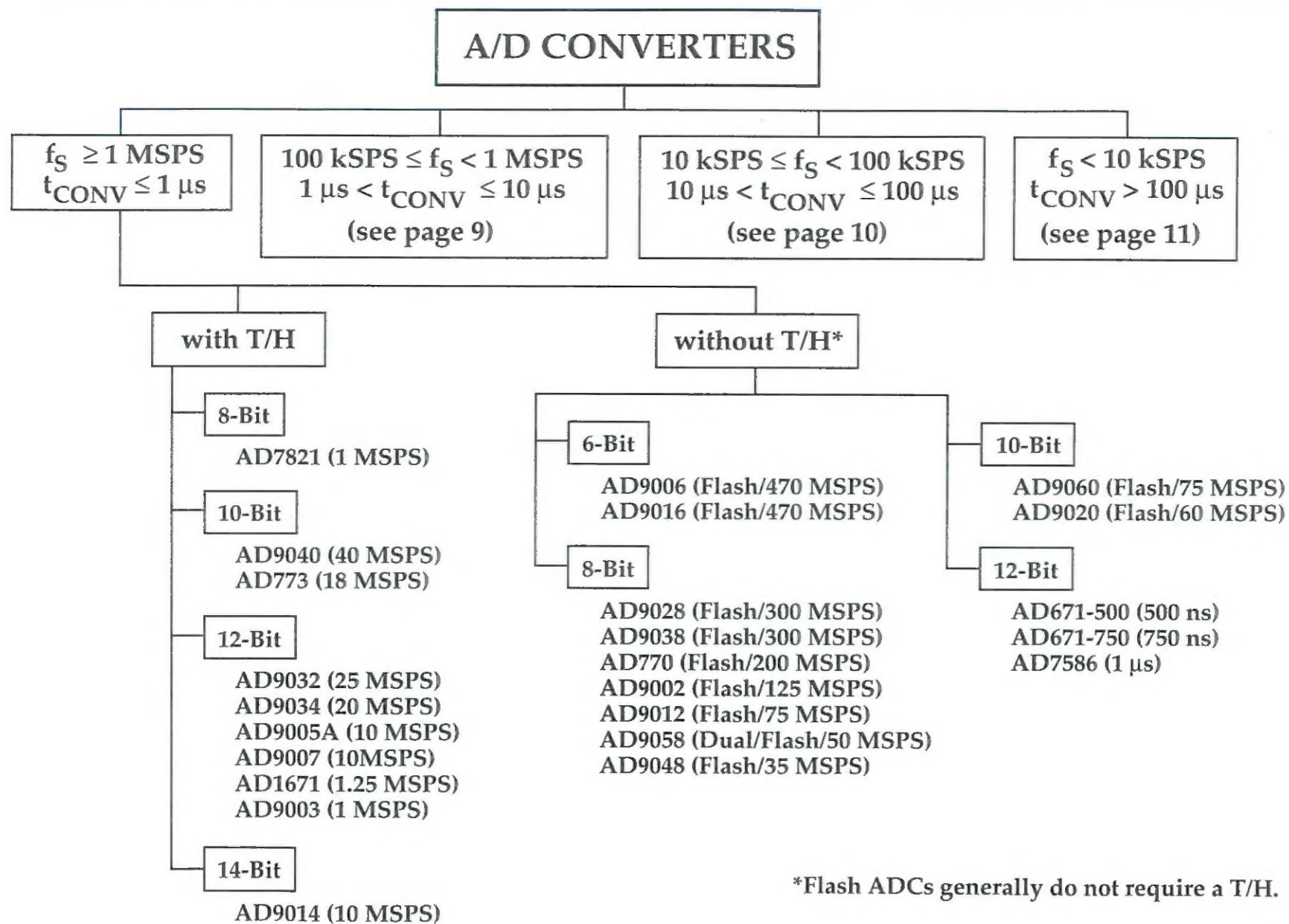
Selection Trees



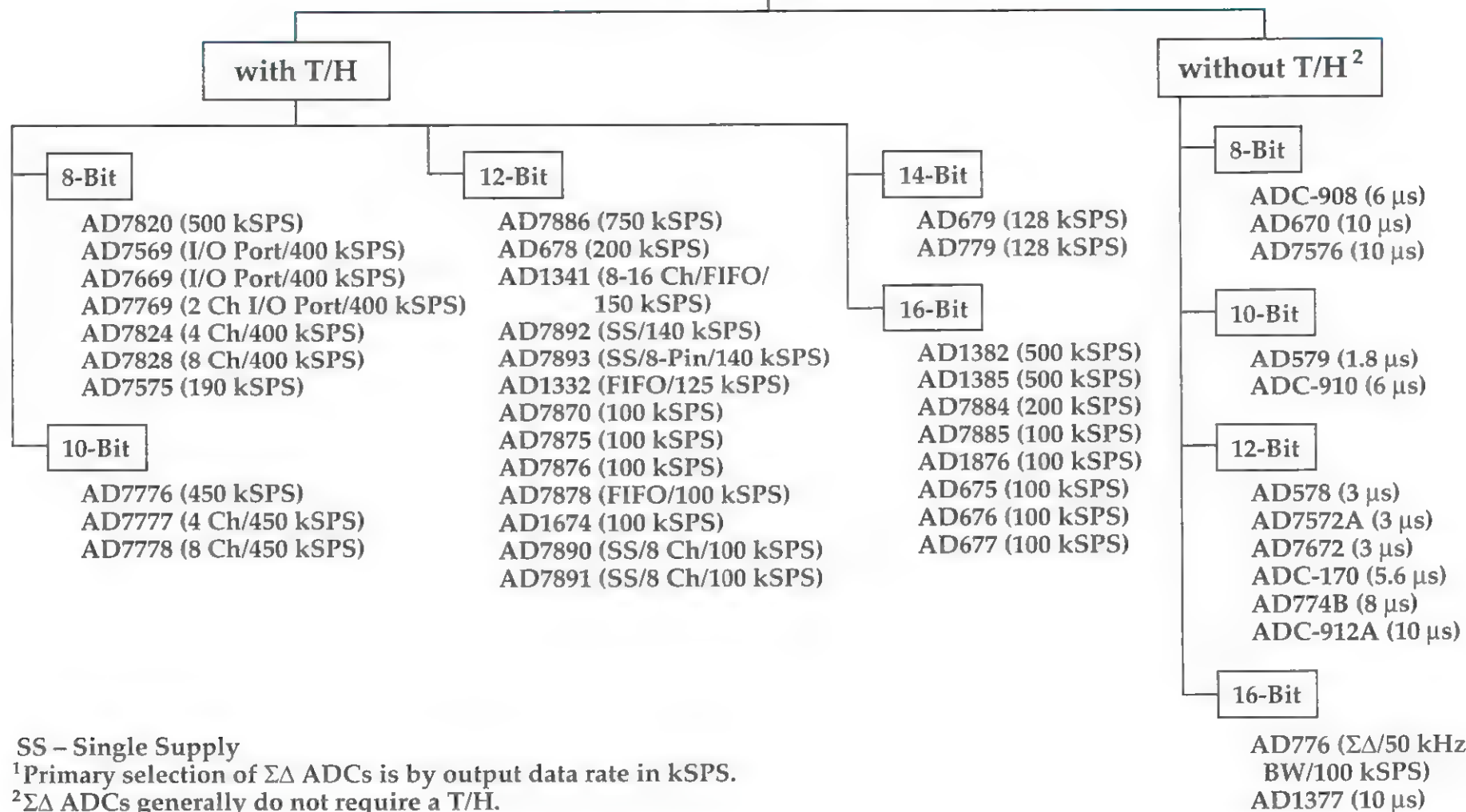


*VGA is a trademark of International Business Machines Corp.
CEG is a registered trademark of Analog Devices, Inc.
SOUNDPORT is a trademark of Analog Devices, Inc.

Selection Trees



A/D CONVERTERS
 $100 \text{ kSPS} \leq f_s < 1 \text{ MSPS}^1$
 $1 \mu\text{s} < t_{\text{CONV}} \leq 10 \mu\text{s}$

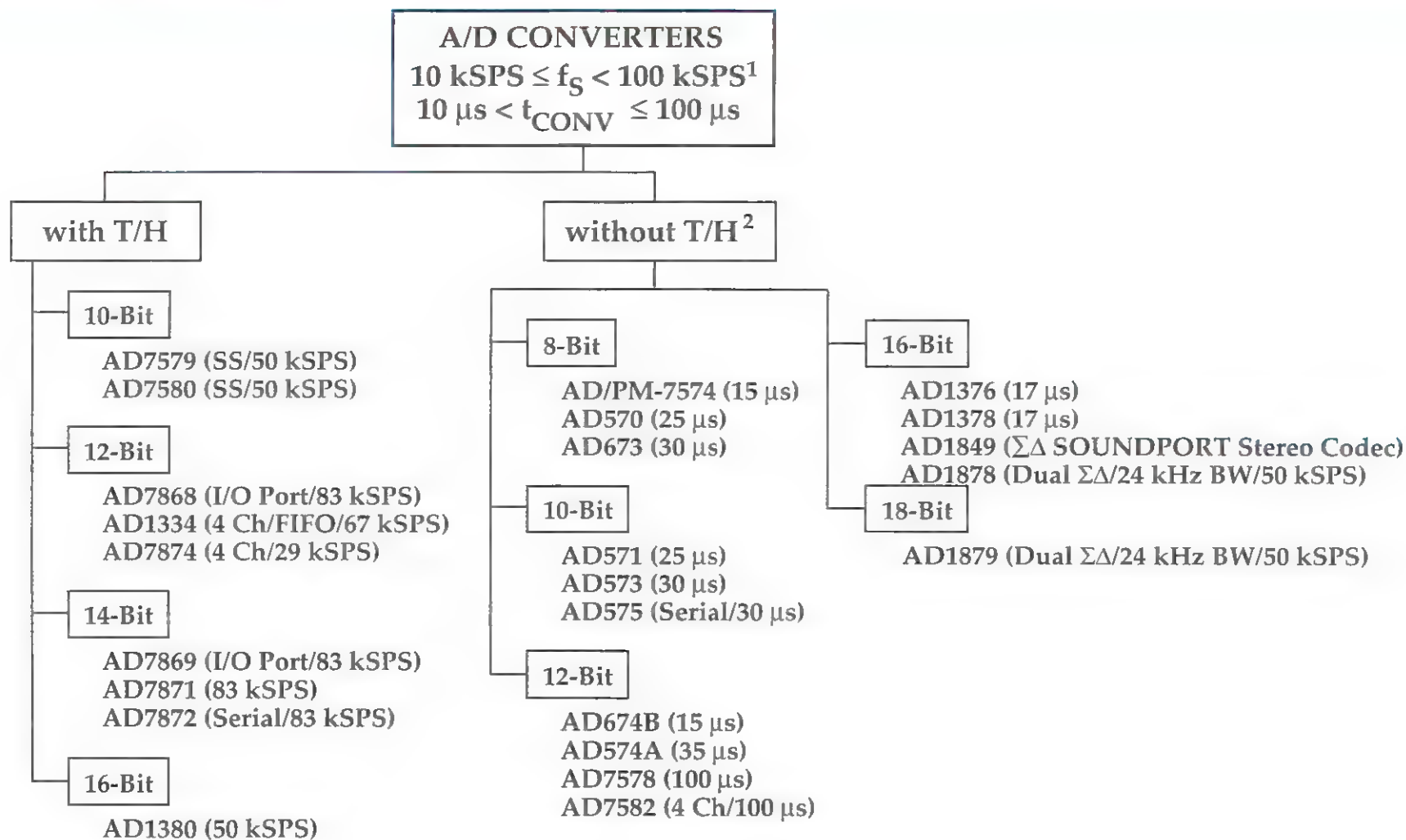


SS – Single Supply

¹Primary selection of ΣΔ ADCs is by output data rate in kSPS.

²ΣΔ ADCs generally do not require a T/H.

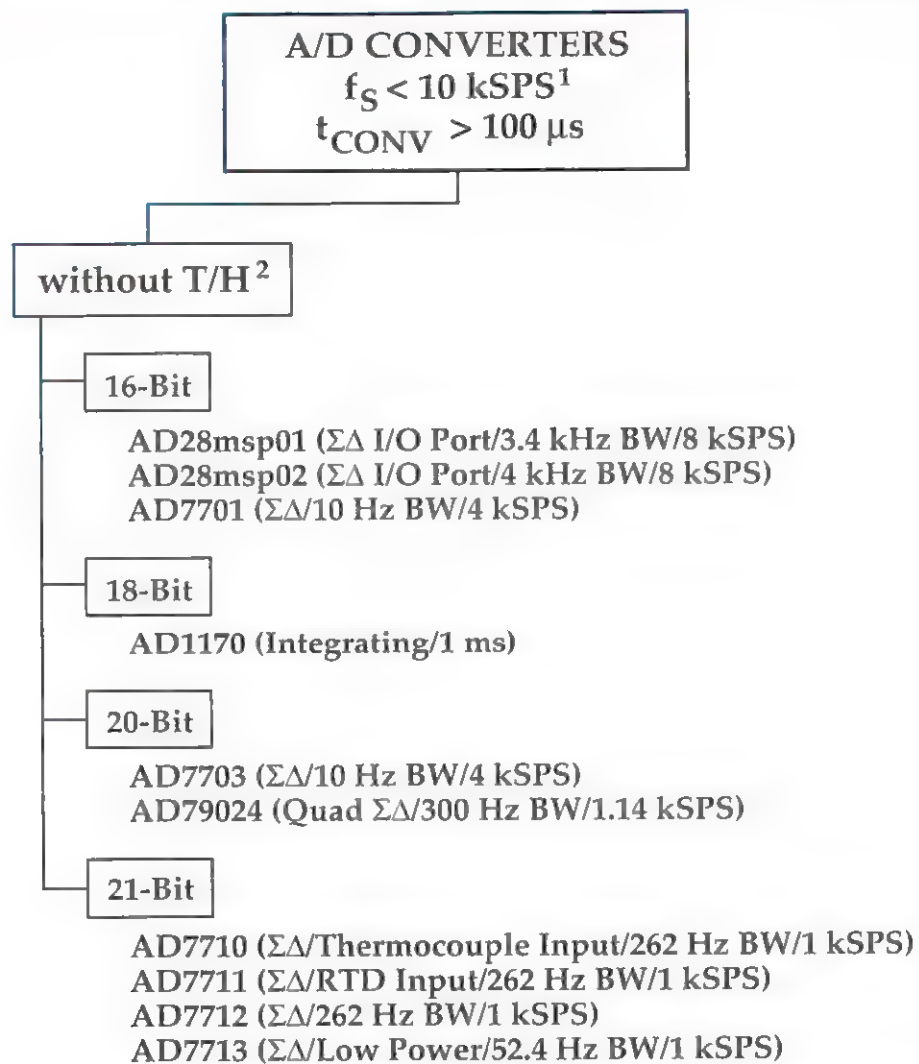
Selection Trees



SS – Single Supply

¹Primary selection of ΣΔ ADCs is by output data rate in kSPS.

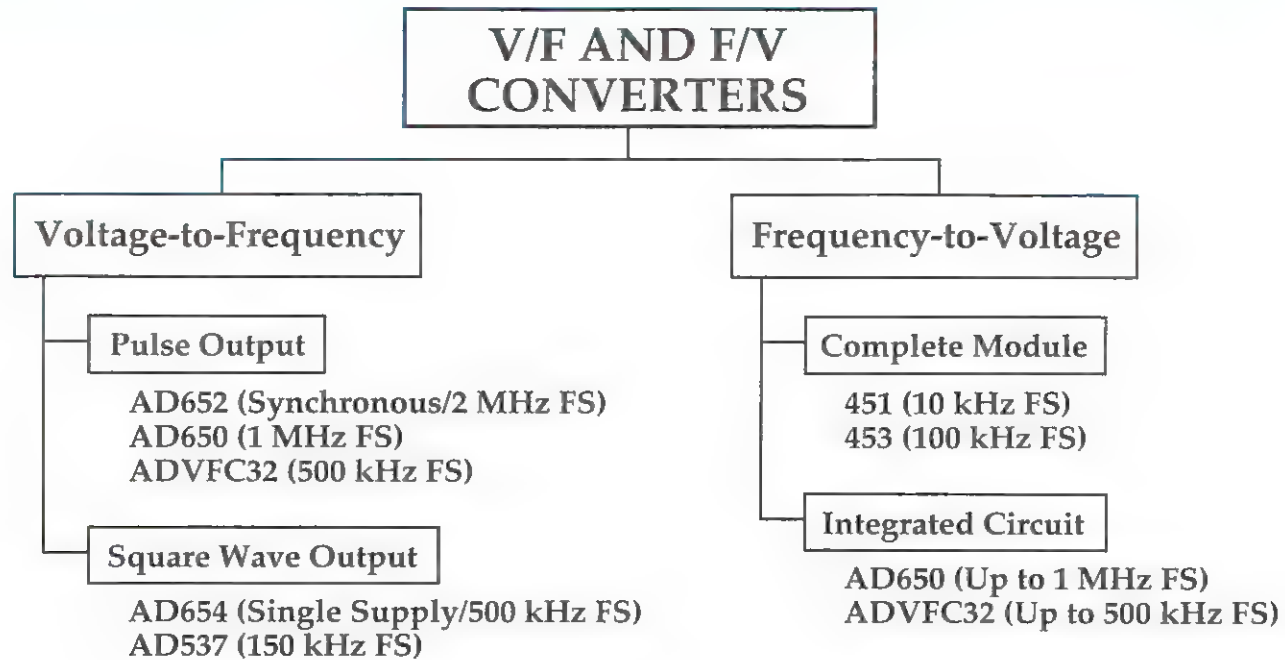
²ΣΔ ADCs generally do not require a T/H.



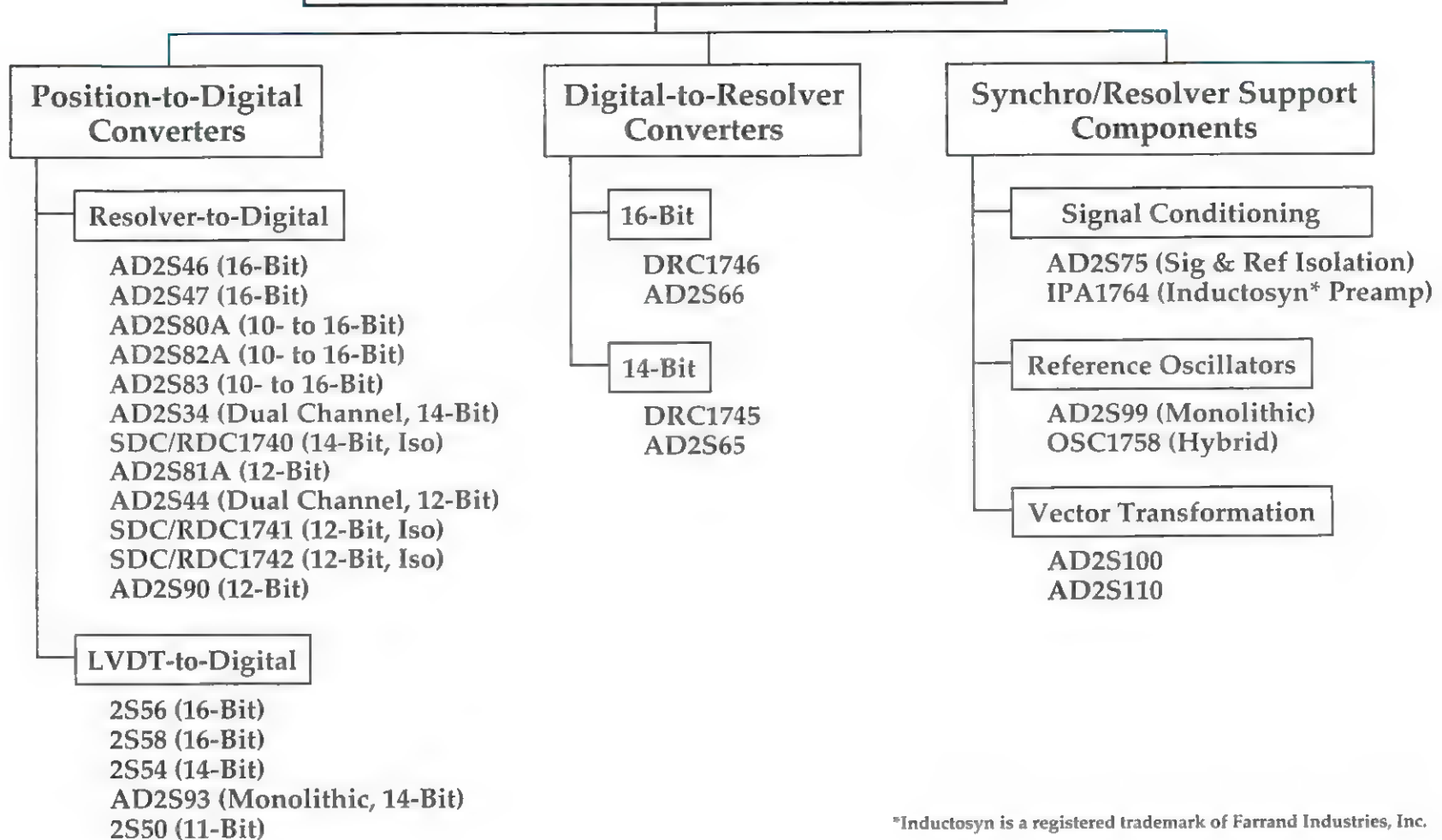
¹ Primary selection of $\Sigma\Delta$ ADCs is by output data rate in kSPS.

² $\Sigma\Delta$ ADCs generally do not require a T/H.

Selection Trees

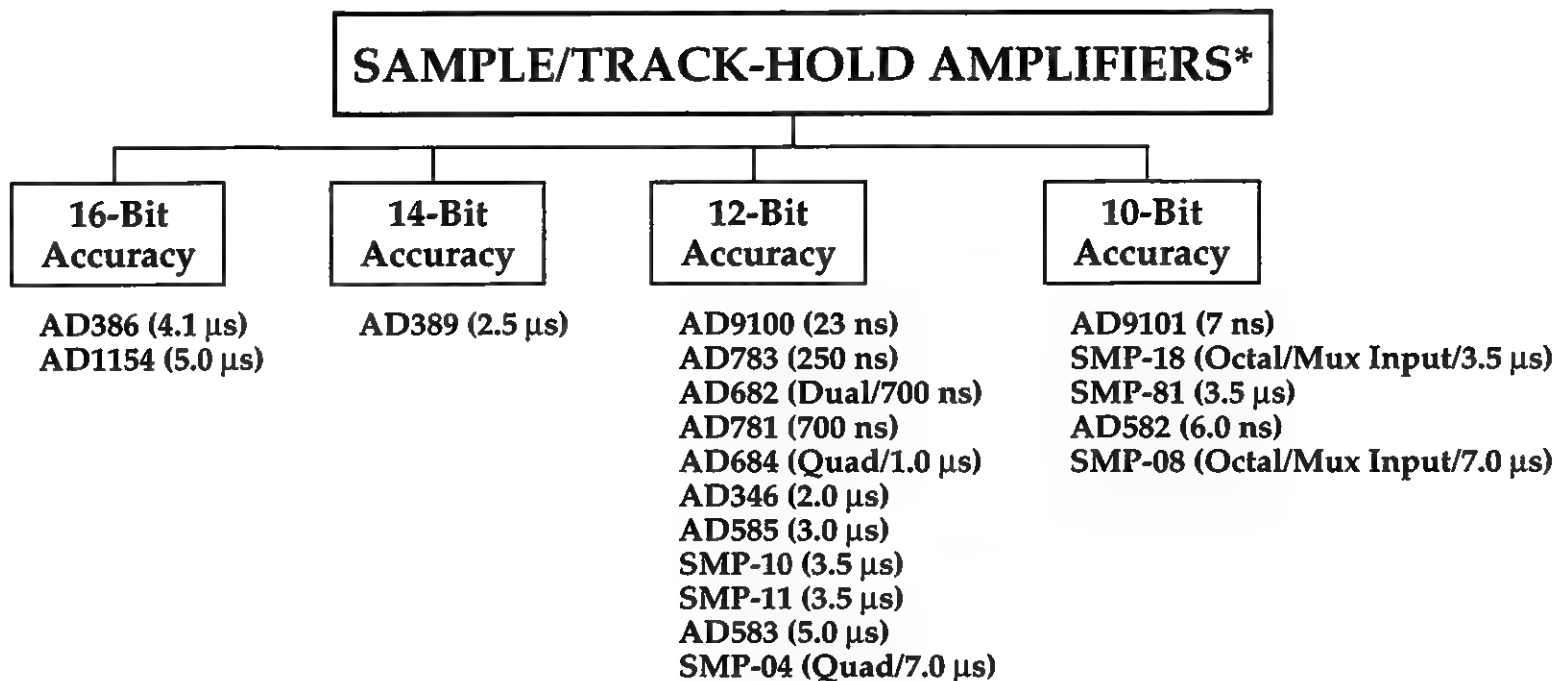


MOTION CONTROL PRODUCTS

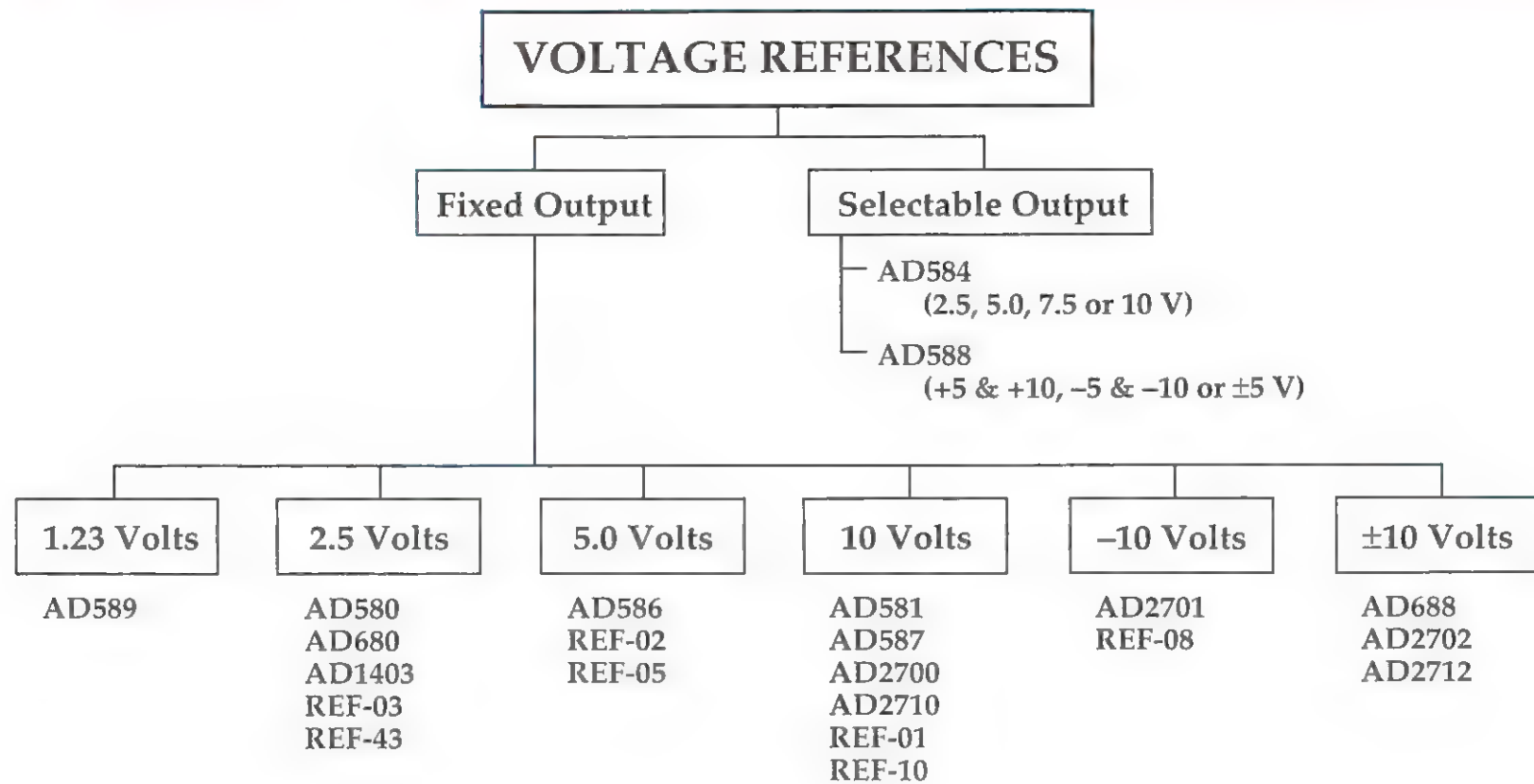


*Inductosyn is a registered trademark of Farrand Industries, Inc.

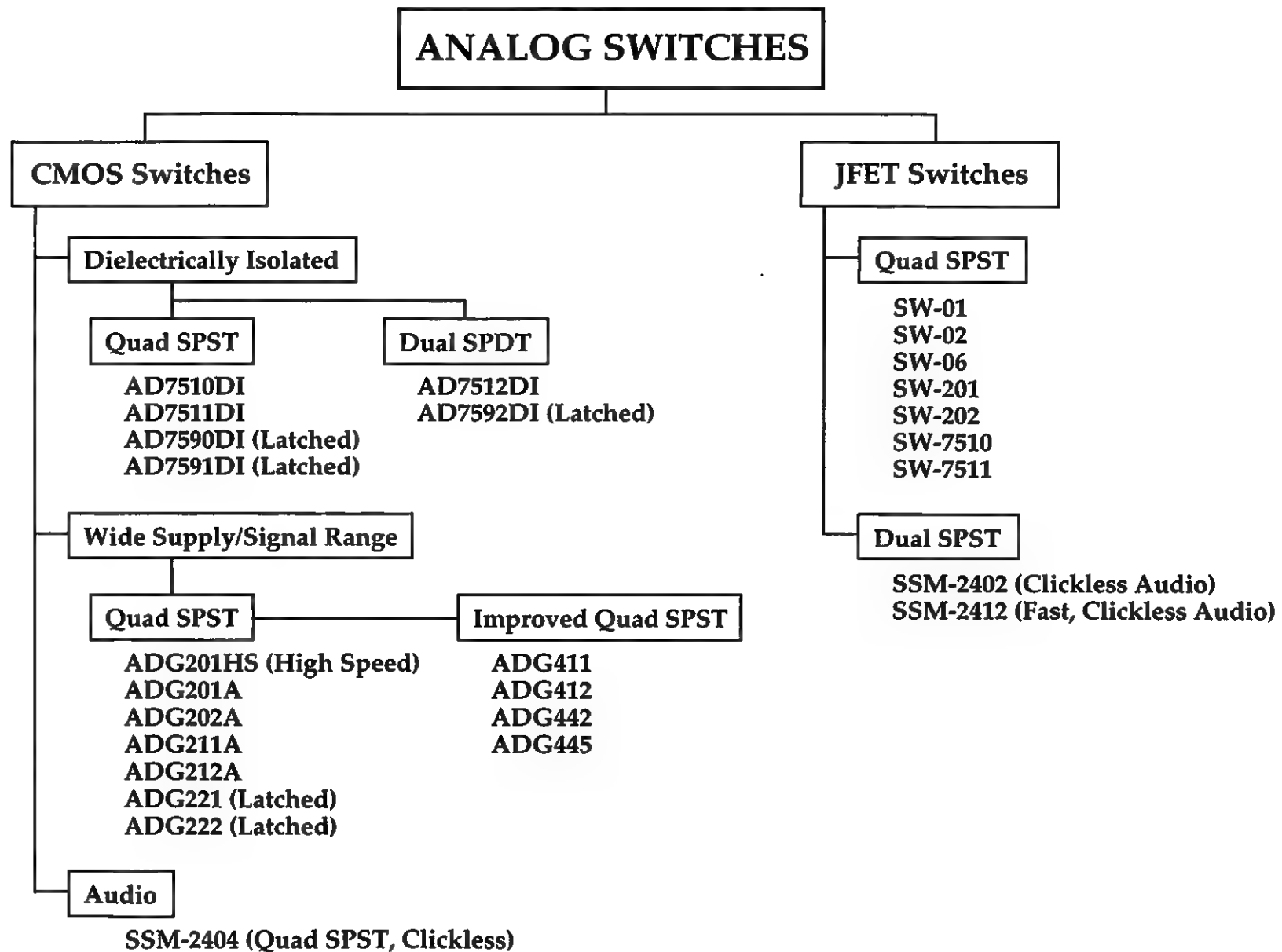
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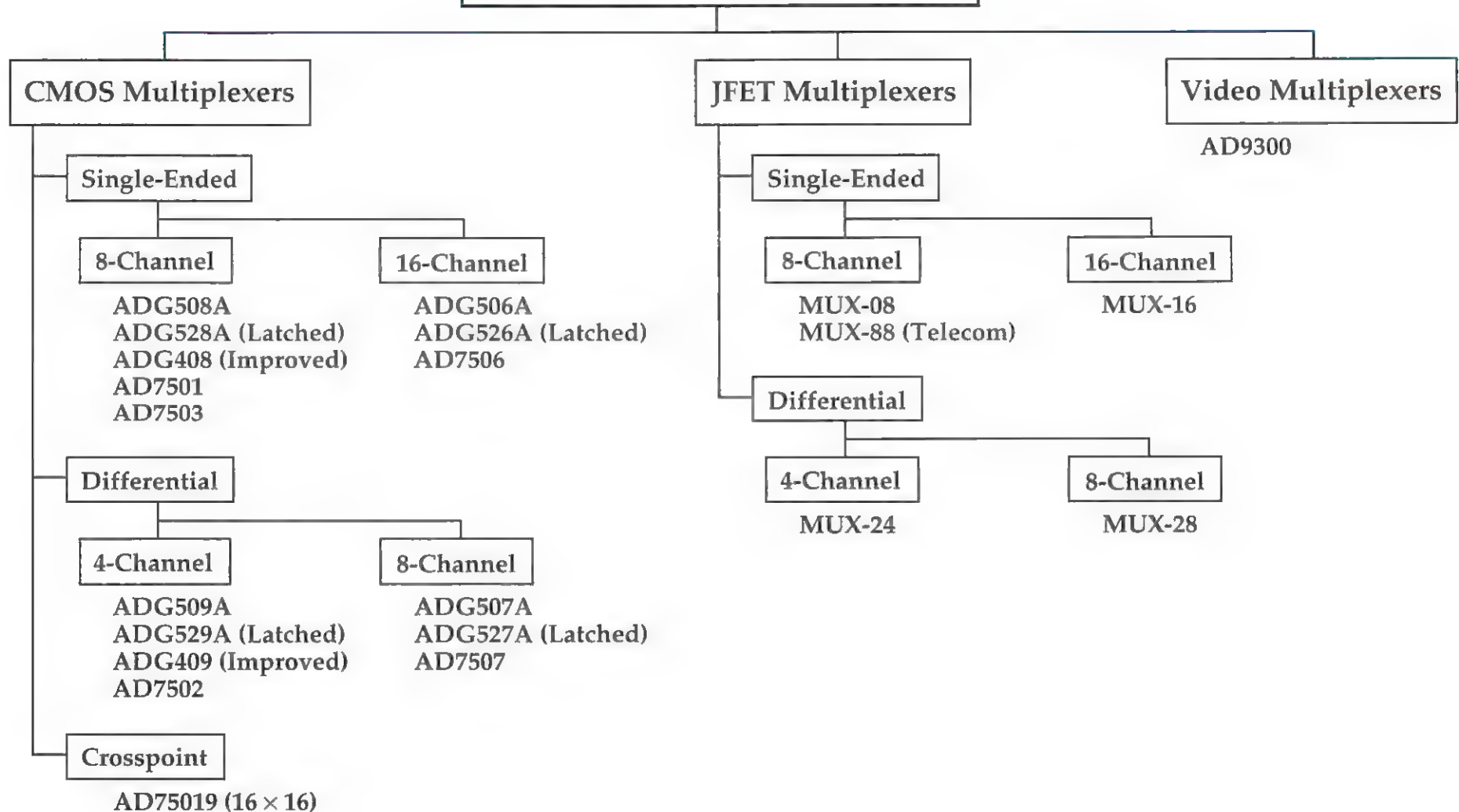
*Times noted are acquisition times to rated accuracy.



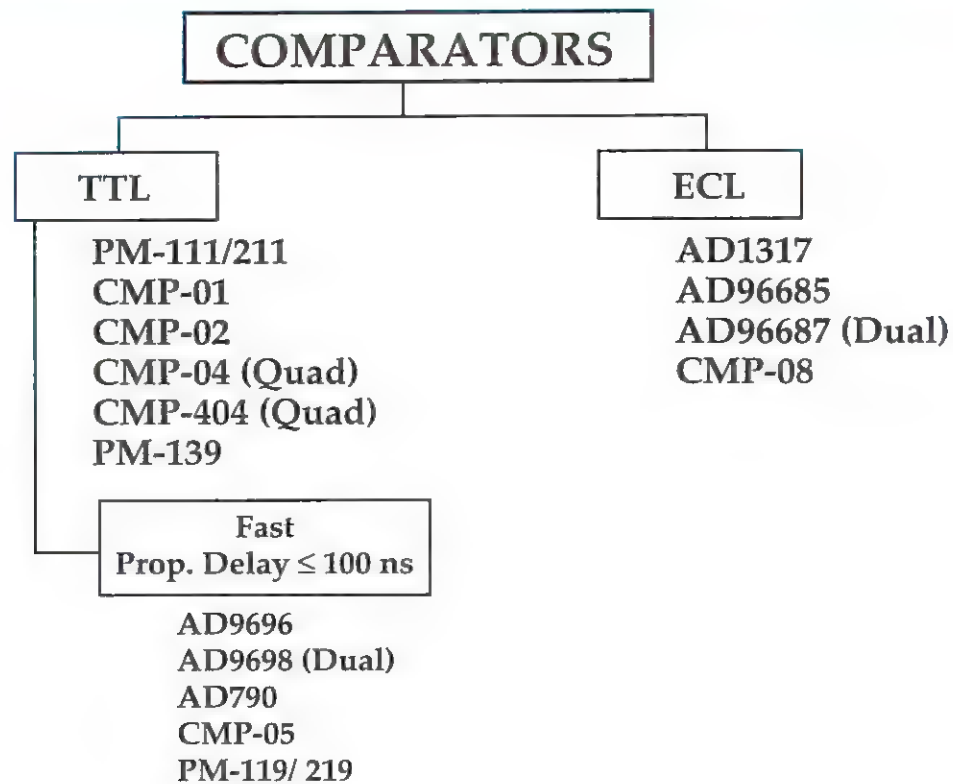
Selection Trees



ANALOG MULTIPLEXERS

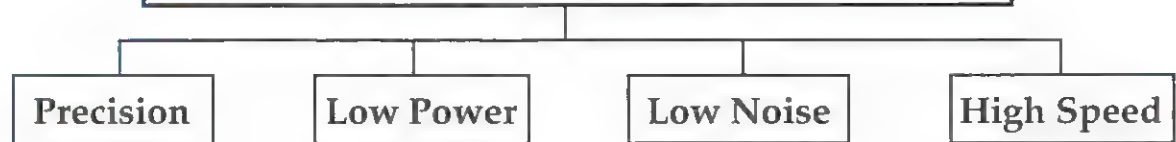


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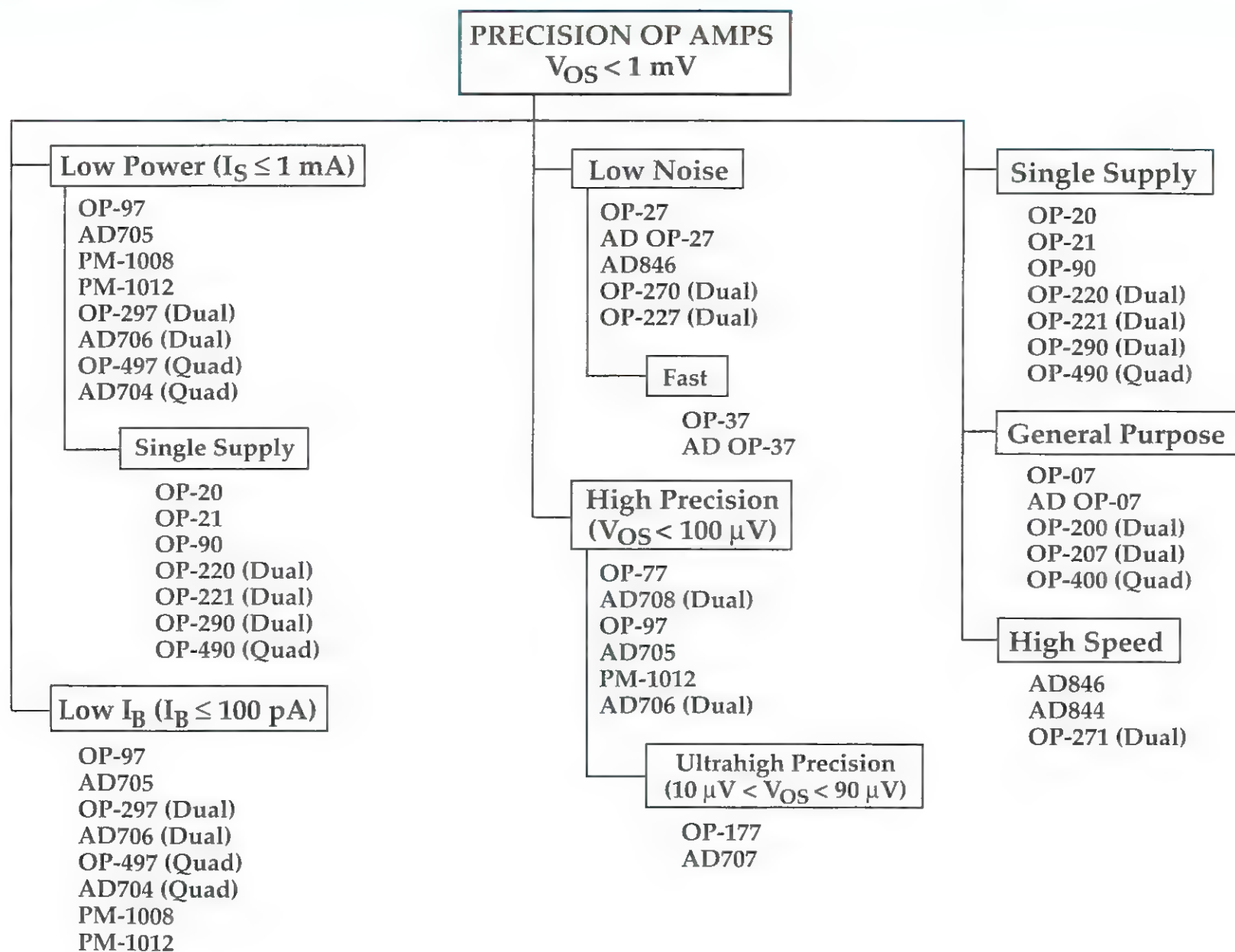


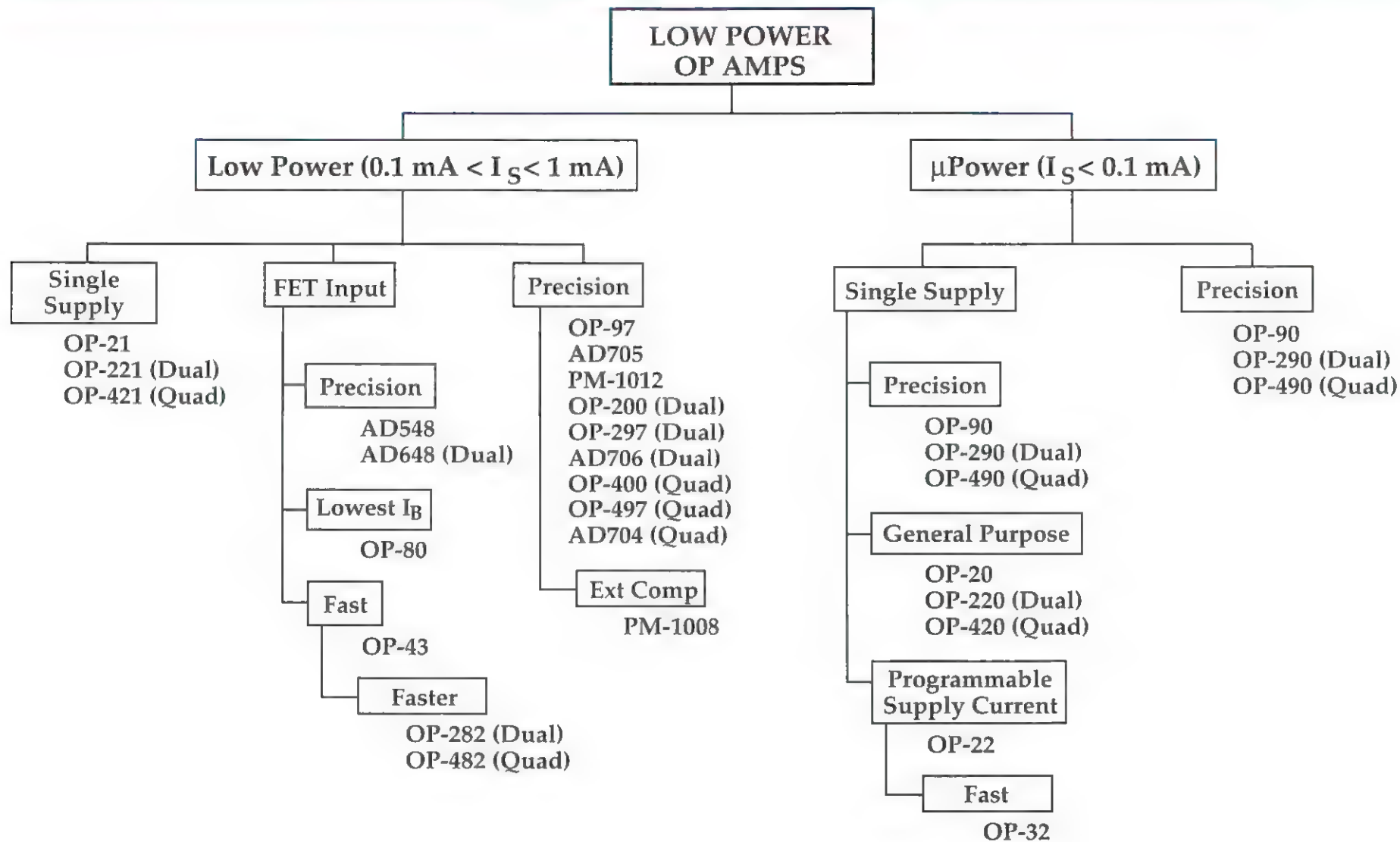
OPERATIONAL AMPLIFIERS

(See following pages for detailed selection trees)

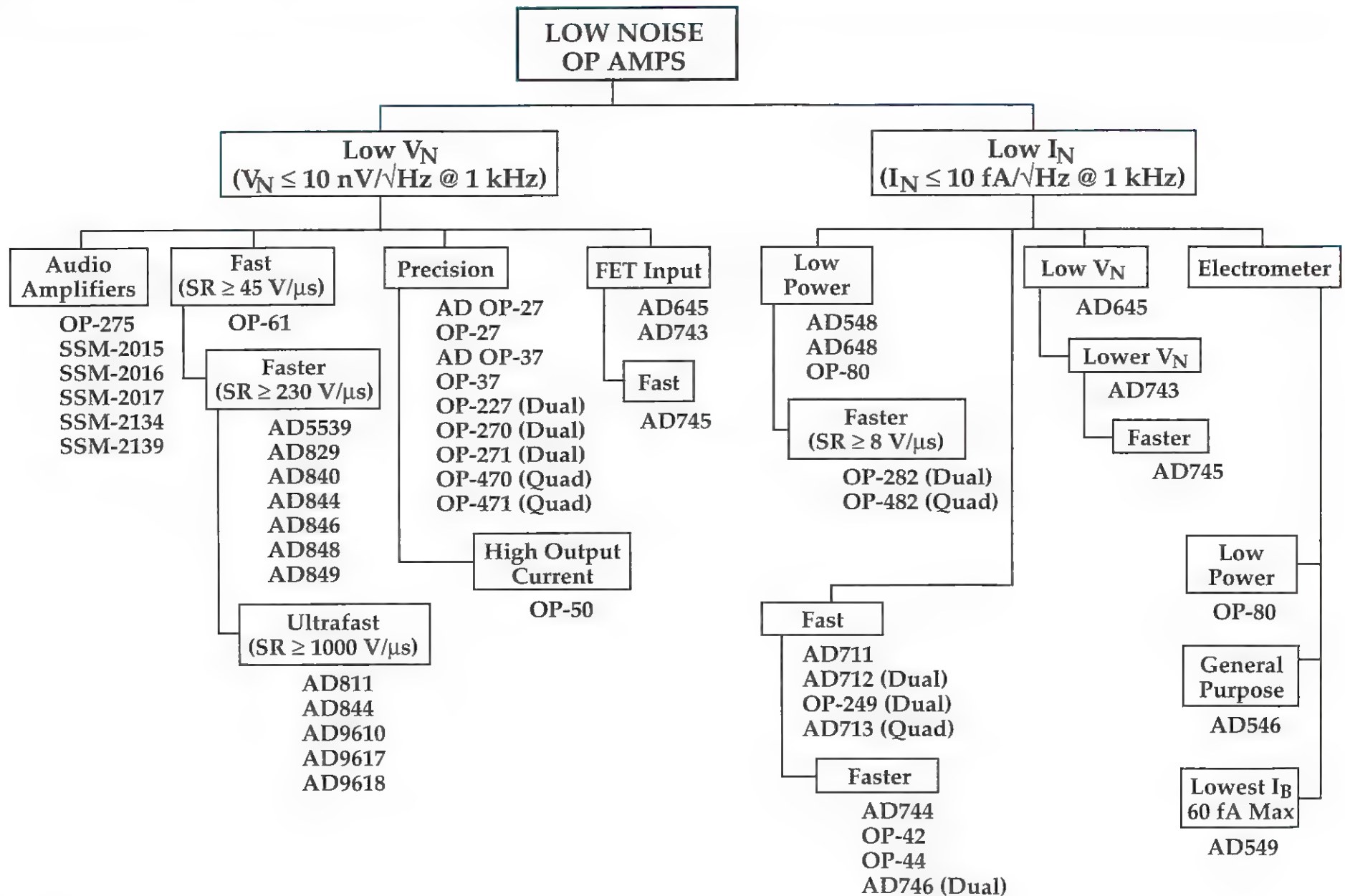


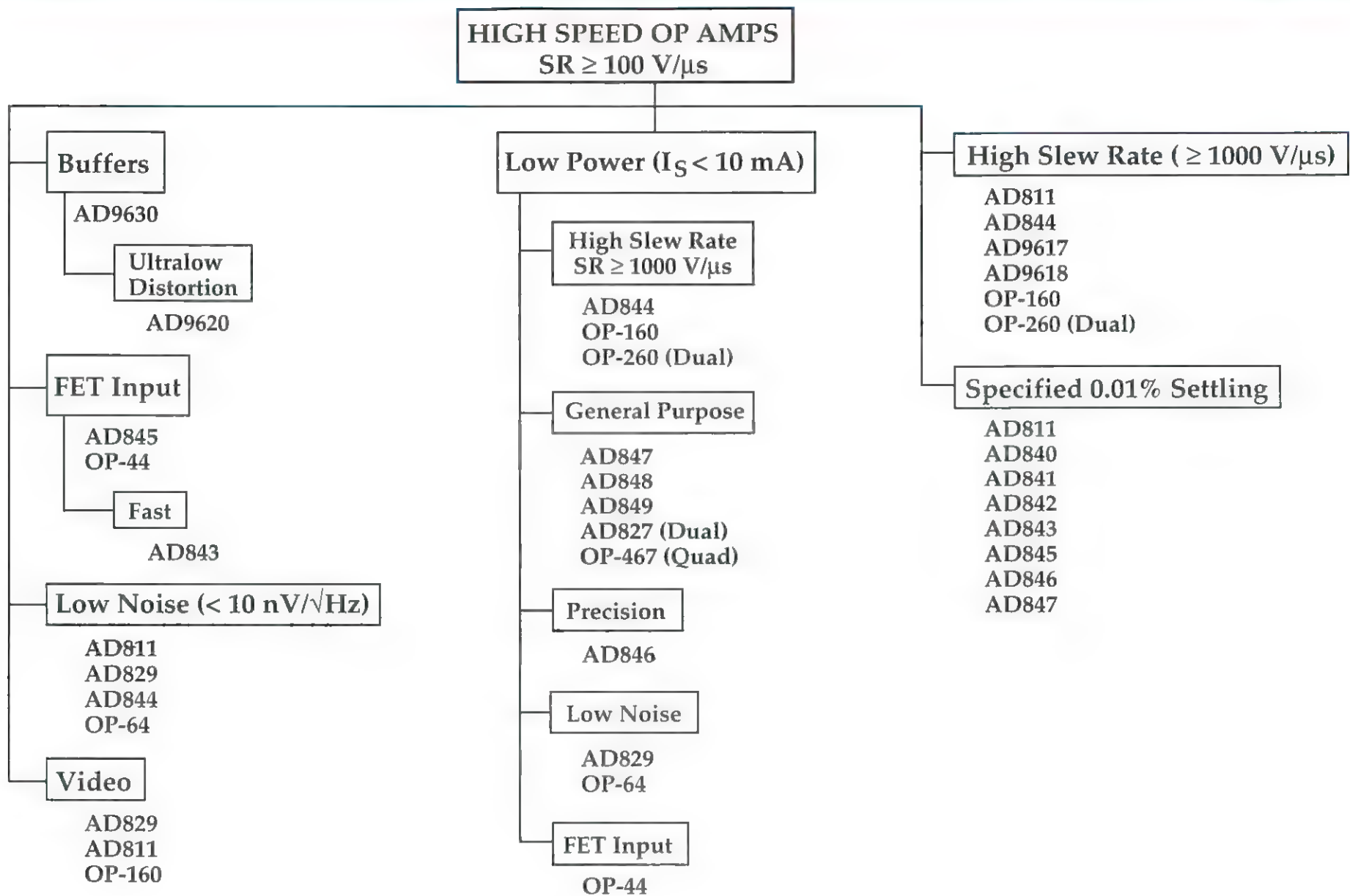
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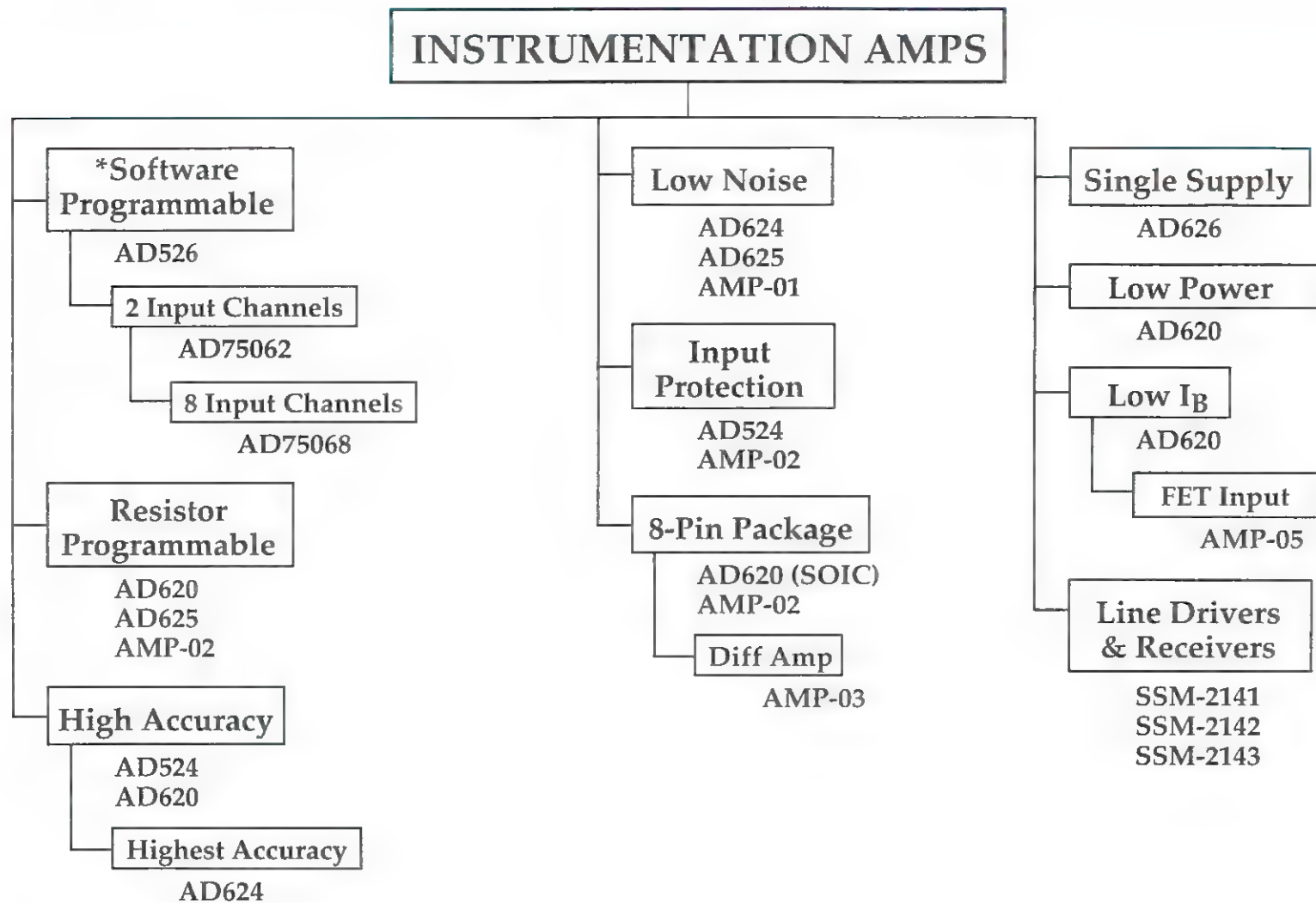


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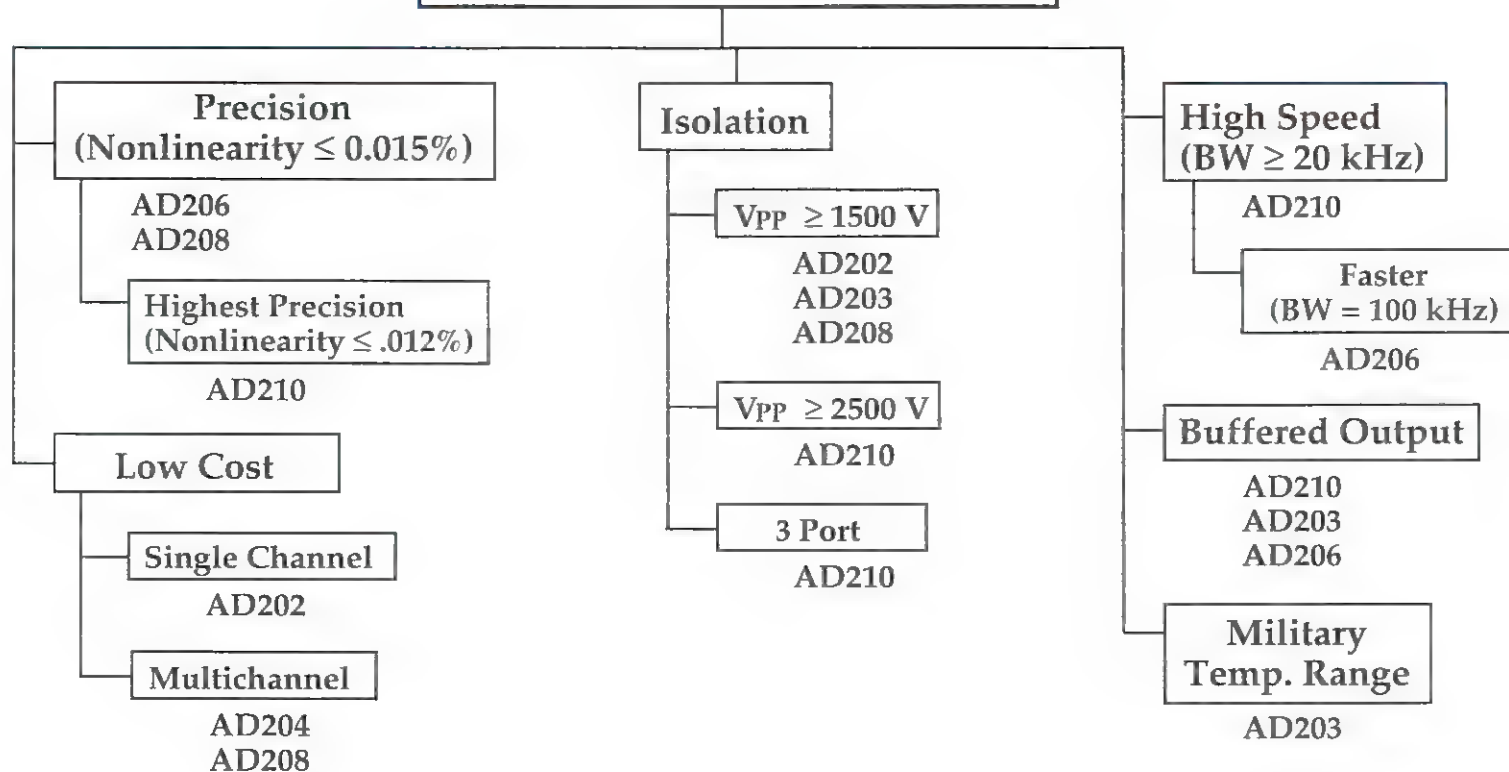


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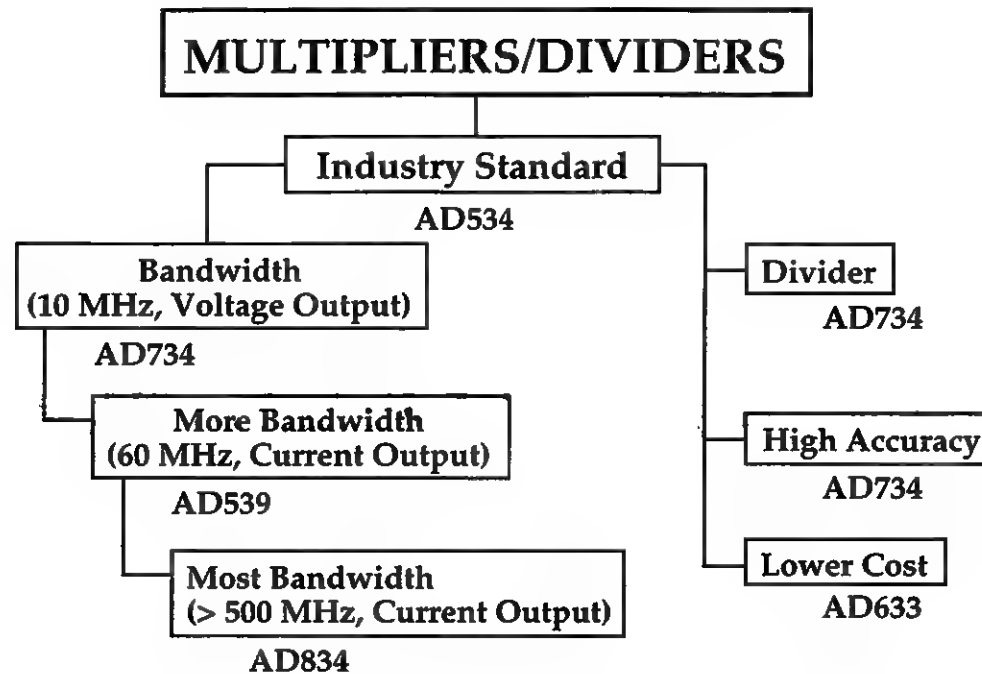


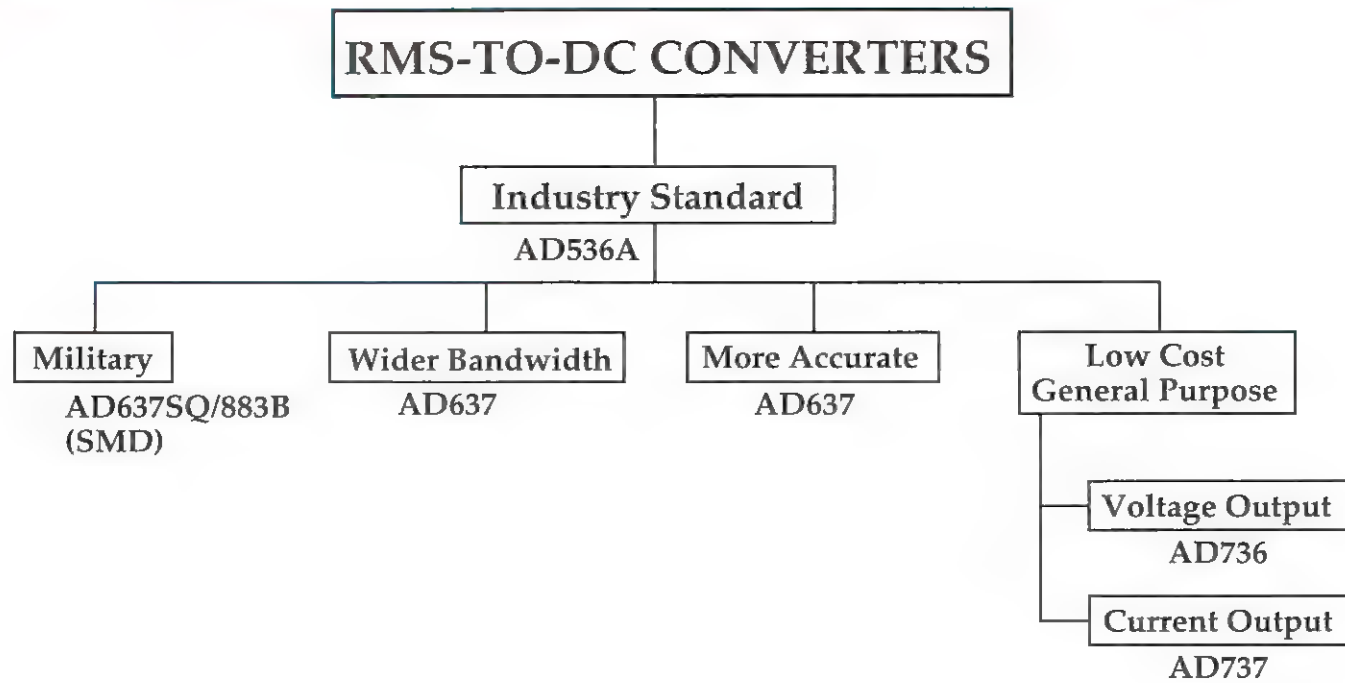
*Single-Ended Input

ISOLATION AMPLIFIERS

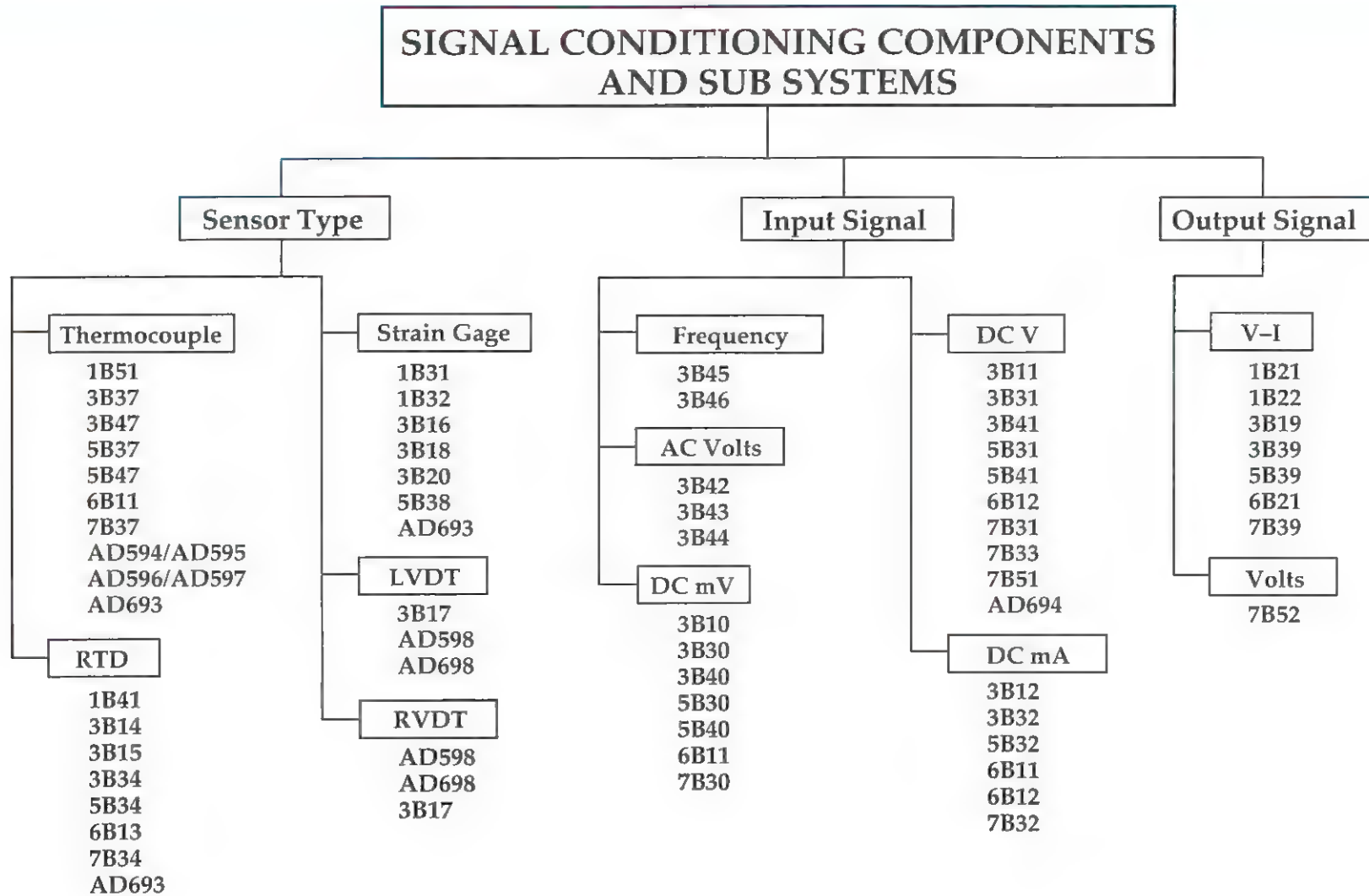


Selection Trees

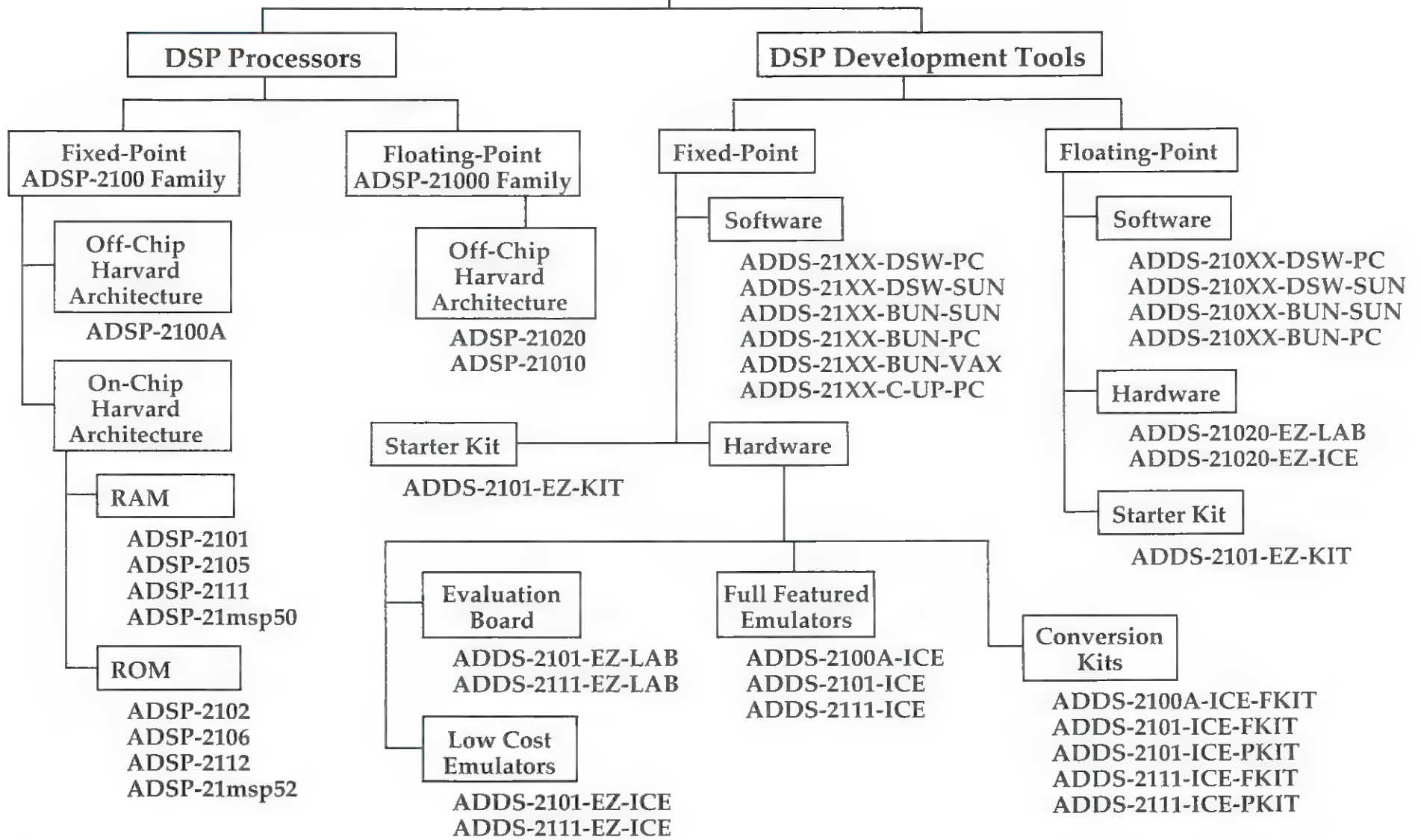




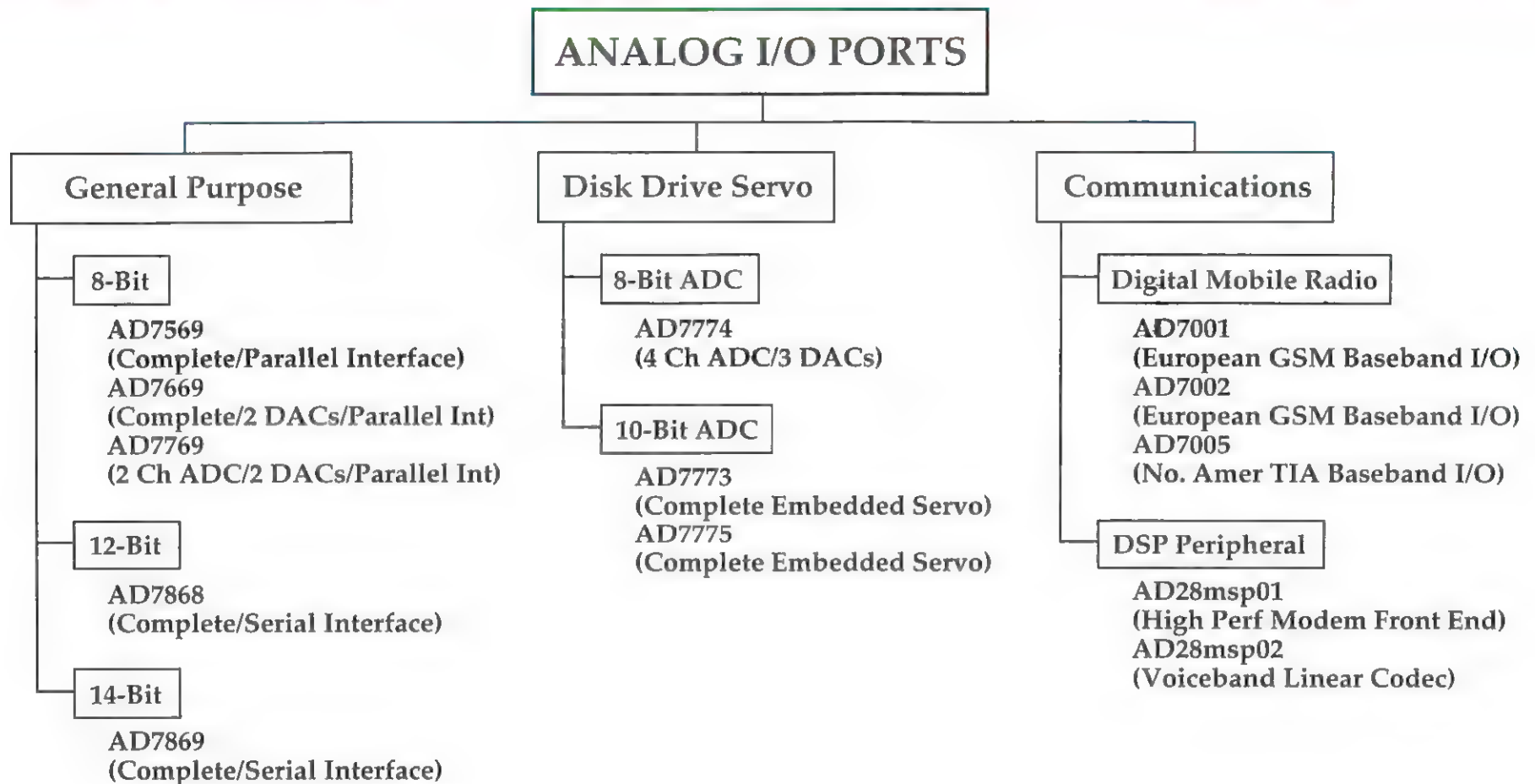
Selection Trees



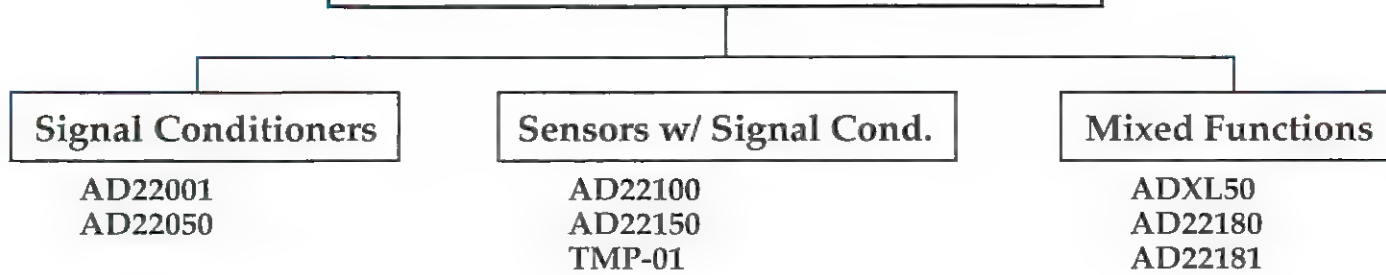
DIGITAL SIGNAL PROCESSING COMPONENTS



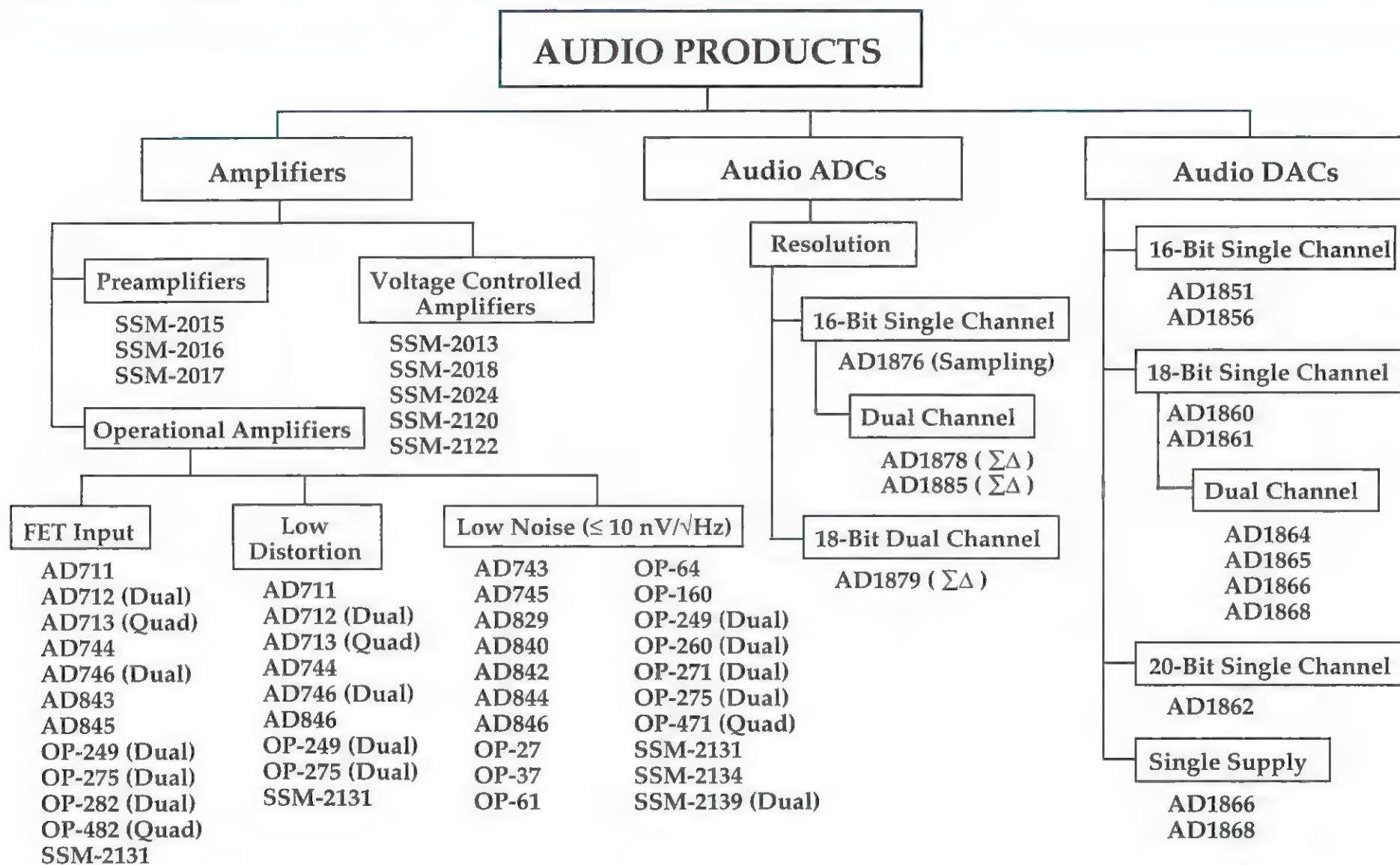
Selection Trees



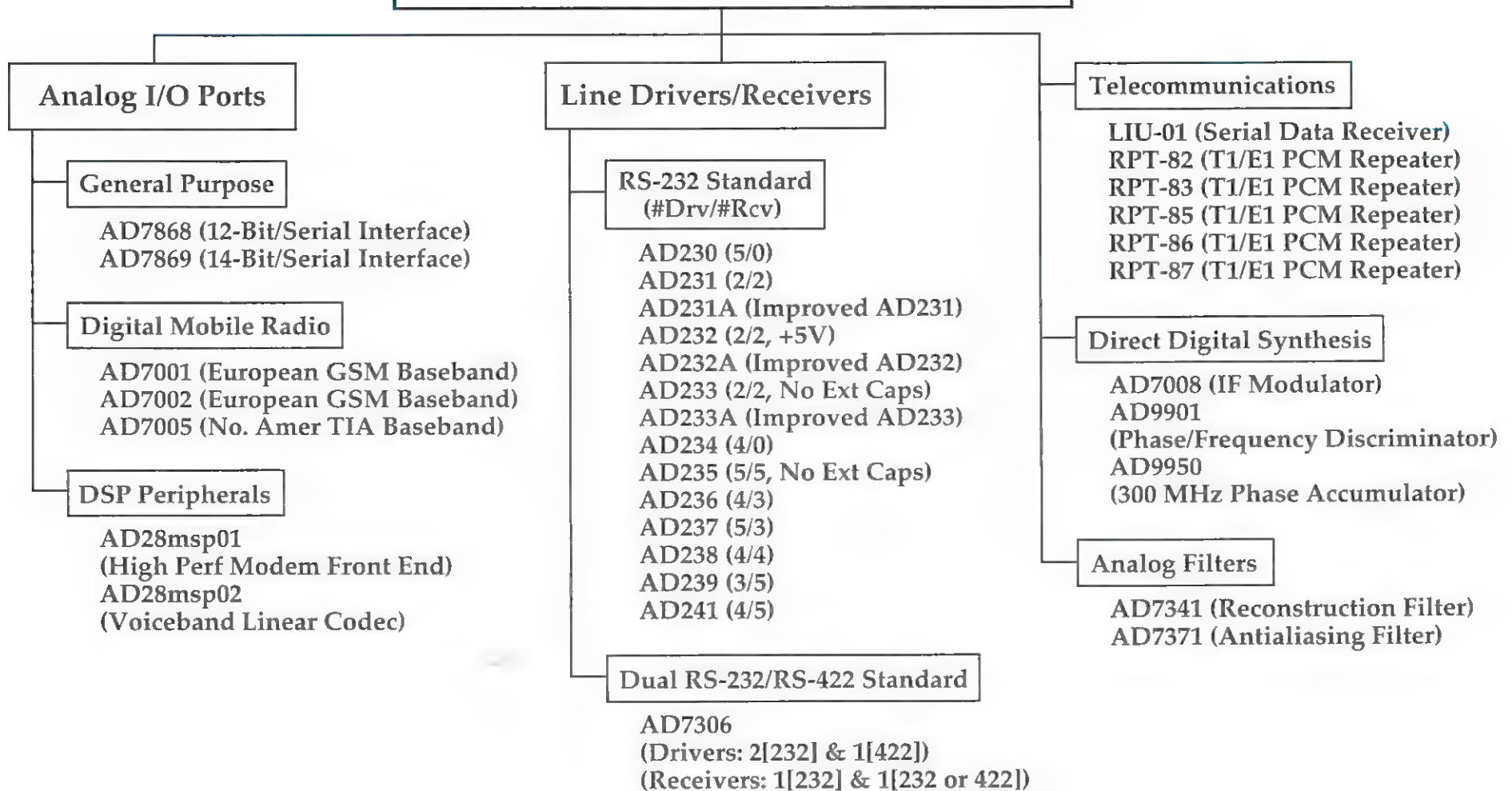
AUTOMOTIVE COMPONENTS



Selection Trees



COMMUNICATIONS PRODUCTS



Selection Guides

Digital-to-Analog Converters

Single DACs, Current Output

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Volt Int/Ext (M) ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9768	8	0.005	8, μ P	-1.26 V, Int	1, 4	C, M	C I	Ultrahigh Speed, ECL Compatible, 20 mA Output Current	18.75
DAC-08	8	0.085	8	Ext (M)	2, 3, 4, 6	C, I, M	C I	8-Bit High Speed Multiplying DAC	1.20
DAC-20	8	0.085	8	10 V, Ext	2, 3	C	C I	2-Digit BCD High Speed Multiplying DAC	3.25
PM-7524	8	0.10	8, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Low Cost, 8-Bit Multiplying DAC with Latch	2.24
AD7524	8	0.10	8, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Low Cost, 8-Bit Multiplying DAC with Latch	4.50
DAC-1408A	8	0.25	8	Ext (M)	2, 3, 6	C, I	C I	8-Bit Multiplying DAC	1.50
DAC-1508A	8	0.25	8	Ext (M)	3	M	C I	8-Bit Multiplying DAC	4.00
DAC-888	8	0.30	8, μ P	Ext (M)	3	I, M	C I	BYTEDAC 8-Bit High Speed Multiplying DAC	6.00
AD9720	10	0.01	10	Int	2, 3, 4, 6	C, M	C I	Ultrahigh Speed, ECL Compatible, Low Power, 10 pV-s Glitch	†
AD9721	10	0.01	10	Int	2, 3, 4, 6	C, M	C I	Ultrahigh Speed, TTL Compatible, Low Power, 10 pV-s Glitch	†
DAC-10	10	0.085	10	Ext (M)	2, 3, 6	C, M	C I	10-Bit High Speed Multiplying DAC	2.95
AD561	10	0.25	10	Int	1, 2	C, M	C I	Industry Standard 10-Bit DAC, JAN Part Available	12.30
DAC-100	10	0.300	10	6.6 V, Int	3	C, I, M	C I	10-Bit Current Output DAC	11.95
DAC-86	10	0.500	10	Ext (M)	3	I	C I	COMDAC Companding DAC (U-255 Law)	8.25
DAC-88	10	0.500	10	Ext (M)	3	I	C I	COMDAC Companding DAC (U-255 Law)	9.90
DAC-89	10	0.500	10	Ext (M)	3	I	C I	COMDAC Companding DAC (A-Law)	9.90
PM-7533	10	0.60	10	Ext (M)	2, 3, 5, 6	C, I, M	C I	CMOS, Low Cost, 10-Bit Multiplying DAC	3.50
AD7533	10	0.60	10	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Low Cost, 10-Bit Multiplying DAC	4.00
AD9712B	12	0.022	12	Int	2, 3, 4, 5	C, M	C I	ECL Compatible, 25 pV-s Glitch, 0.5 LSB DNL Typ	35.00
AD9713B	12	0.027	12	Int	2, 3, 4, 5	C, M	C I	TTL Compatible, 25 pV-s Glitch, 0.5 LSB DNL Typ	35.00
AD568	12	0.035	12	Int	3, 4	C, M	C I	Highest Accuracy 12-Bit Ultrahigh Speed DAC	33.00
AD668	12	0.05	12	Ext (M)	3	C, M	C I	Multiplying 12-Bit Ultrahigh Speed DAC	33.00
AD565A	12	0.25	12	10 V, Int	1	C, M	C I	Industry Workhorse High Speed, JAN Part Available	17.60
DAC-8043	12	0.25	Serial, μ P	Ext (M)	2, 3	C, I, M	C I	8-Pin DIP Serial Input 12-Bit CMOS Multiplying DAC	8.95
PM-7542	12	0.25	4, μ P	Ext (M)	2, 3, 4, 6	C, I, M	C I	CMOS, Nibble Load 12-Bit Multiplying DAC	11.40
AD7542	12	0.25	4, μ P	Ext (M)	1, 2, 3, 4, 5	C, I, M	C I	CMOS, Nibble Load 12-Bit Multiplying DAC	14.25
PM-6012	12	0.25	12	Ext (M)	2, 3, 6	I	C I	12-Bit High Speed Multiplying DAC	†
DAC-312	12	0.25	12	Ext (M)	2, 3, 6	C, M	C I	Low Cost, High Speed 12-Bit Multiplying DAC	4.50
AD DAC80-I	12	0.30	12	6.3 V, Int	1	C	C I	Industry Standard, High Speed DAC	24.50
AD DAC85-I	12	0.30	12	6.3 V, Int	1	I, M	C I	Improved Industry Standard, High Speed DAC	27.00
AD DAC87-I	12	0.30	12	6.3 V, Int	1	I, M	C I	Improved Industry Standard, High Speed DAC	95.00
AD566A	12	0.35	12	10 V, Ext	1	C, M	C I	High Speed DAC	15.00
AD7543	12	0.35	Serial, μ P	Ext (M)	1, 2, 3, 4, 5, 6	C, I, M	C I	CMOS, Serial Load 12-Bit Multiplying DAC	14.25
DAC-8143	12	0.38	Serial, μ P	Ext (M)	2, 3, 6	I, M	C I	CMOS, Serial Load 12-Bit Multiplying DAC, Daisy Chain	6.53
PM-7543	12	0.38	Serial, μ P	Ext (M)	2, 3, 5, 6	C, I, M	C I	12-Bit Serial Input DAC	6.40
PM-7541A	12	0.60	12	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, 12-Bit Multiplying DAC	7.17
AD7541A	12	0.60	12	Ext (M)	2, 3, 4, 5	C, I, M	C I	CMOS, 12-Bit Multiplying DAC	8.95
DAC-8012	12	1.0	12, μ P	Ext (M)	2, 3, 5	C, I, M	C I	12-Bit CMOS DAC with Memory and Readback	8.28
PM-7548	12	1.0	8, μ P	Ext (M)	2, 3, 5, 6	C, I, M	C I	CMOS, Byte Load 12-Bit DAC, Single or Dual Supply	7.58

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Volt Int/Ext (M) ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7548	12	1.0	8, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Byte Load 12-Bit DAC, Single or Dual Supply	9.48
AD562	12	1.5	12	Ext	1	C, I, M	C I	Industry Standard, JAN Part Available	63.90
AD563	12	1.5	12	2.5 V, Int	1	C, M	C I	Industry Standard	44.10
AD7545A	12	1.0	12, μ P	Ext (M)	2, 3, 4, 5	C, I, M	C I	CMOS, Improved AD7545	7.55
PM-7545	12	1.0	12, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Parallel Load 12-Bit Multiplying DAC	6.40
PM-7645	12	1.0	12, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	PM-7545 Specified for +15 V Operation, TTL Compatible	6.40
AD7545	12	2.0	12, μ P	Ext (M)	2, 3, 4, 5	C, I, M	C I	CMOS, Parallel Load 12-Bit Multiplying DAC	8.00
AD7534	14	1.5	8, μ P	Ext (M)	2, 3, 5	C, I, M	C I	CMOS, Byte Load	14.25
AD7535	14	1.5	8/14, μ P	Ext (M)	2, 3, 4, 5	C, I, M	C I	CMOS, Parallel or Byte Load	18.95
AD7536	14	1.5	8/14, μ P	Ext (M)	2, 3, 4, 5	C, I, M	C I	CMOS, Parallel or Byte Load, Bipolar Output	18.95
AD7538	14	1.5	14, μ P	Ext (M)	2, 3, 6	C, I, M	C I	CMOS, Parallel Load	10.50
AD1851	16	0.35	Serial	Int	2, 6	C	C I	16-Bit $16 \times F_s$ PCM Audio DAC	6.98
AD1856	16	0.35	Serial	Int	2, 6	C	C I	16-Bit PCM Audio DAC	12.60
DAC-16	16	0.5	16	Ext (M)	2, 3, 4	I, M	C I	16-Bit High Speed Multiplying DAC	25.00
AD DAC71-I	16	1.0	16	6.3 V, Int	1, 7	C	C I	High Resolution 16-Bit DAC	44.00
AD DAC72-I	16	1.0	16	6.3 V, Int	1, 7	C, I	C I	High Resolution 16-Bit DAC	52.00
AD1860	18	0.35	Serial	Int	2, 6	C	C I	18-Bit PCM Audio DAC	14.05
AD1861	18	0.35	Serial	Int	2, 6	C	C I	18-Bit $16 \times F_s$ PCM Audio DAC	7.50
AD1862	20	0.35	Serial	Int	2	C	C I	20-Bit Audio DAC	17.20

¹This column lists the data format for the bus with “ μ P” indicating microprocessor capability — i.e., for a 12-bit converter 8/12, μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

²Ext indicates external reference with the range of voltages listed where applicable. Ext - M indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

Selection Guides

Digital-to-Analog Converters

Single DACs, Voltage Output

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Volt Int/Ext (M) ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD557	8	0.8	8, μ P	Int	2, 5	C	C I	Lowest Cost 8-Bit DACPORT™; Single +5 V Supply	3.35
AD7569	8	1.0	8, μ P	Int	2, 3, 4, 5, 6	C, I, M	C II	CMOS, Complete 8-Bit DAC/ADC/SHA/ Reference	6.00
AD558	8	3.0	8, μ P	Int	1, 2, 4, 5	C, M	C I	10 V Out DACPORT, Single or Dual Supply	5.95
PM7224	8	5.0	8, μ P	2–12.5 V, Ext	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Low Cost 8-Bit DAC	3.96
AD7224	8	5.0 (max)	8, μ P	2–12.5 V, Ext	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Low Cost 8-Bit DAC	4.95
DAC-06	10	1.5	10	6.7 V, Int	1	C, M	C I	Twos Complement Input Coding	19.80
DAC-210	10	1.5	10	7.6 V, Int	1	C, I	C I	Sign-Magnitude/Internal Reference	9.50
DAC-05	10	2.0	10	6.7 V, Int	1	C, M	C I	Sign-Magnitude for Unipolar Output	33.28
DAC-02	10	2.0	10	6.7 V, Int	1	C, M	C I	Sign-Magnitude/Bipolar Output	18.70
AD7848	12	2.5	12, μ P	Int (+3 V), Ext	2, 3, 5	C, I	C I	CMOS, Complete 12-Bit DAC with 8-Word FIFO	9.95
AD7845	12	2.5	12, μ P	Ext (M)	2, 3, 4, 5, 6	C, I, M	C I	CMOS, 12-Bit Multiplying DAC with Output Amplifier	7.40
AD DAC80-V	12	3.0	12	6.3 V, Int	1	C	C I	Improved Industry Standard	24.90
AD DAC85-V	12	3.0	12	6.3 V, Int	1	I, M	C I	Improved Industry Standard	29.50
AD DAC87-V	12	3.0	12	6.3 V, Int	1	I, M	C I	Improved Industry Standard	95.00
AD667	12	3.0	4/8/12, μ P	10 V, Int	1, 2, 4, 5	C, I, M	C I	Highest Accuracy Complete 12-Bit DAC	11.95
AD767	12	3.0	12, μ P	10 V, Int	1, 2	C, I, M	C I	Fastest Interface Complete 12-Bit DAC	9.85
AD7233	12	10 (max)	Serial, μ P	Int	2	I	C I	Smallest 12-Bit Serial DACPORT (8-Pin)	7.00
								Bipolar ± 5 V Output Range	
AD7243	12	10 (max)	Serial	Int (+5 V), Ext	2, 3, 6	I, M	C I	Low Cost 12-Bit Serial DACPORT in 16-Pin Package	7.00
AD7245A	12	10 (max)	12, μ P	5 V, Int	2, 3, 4, 5, 6	C, I, M	C I	Faster Interface, 12 V and 15 V AD7245	†
AD7248A	12	10 (max)	8, μ P	5 V, Int	2, 3, 5, 6	C, I, M	C I	Faster Interface, 12 V and 15 V AD7248	†
AD7245	12	10 (max)	12, μ P	5 V, Int	2, 3, 4, 5	C, I, M	C I	CMOS, 12-Bit Complete DAC, Parallel Load	9.85
AD7248	12	10 (max)	8, μ P	5 V, Int	2, 3, 4, 5	C, I, M	C I	CMOS, 12-Bit Complete DAC, Byte Load	9.85
AD7840	14	2.0	14/Serial, μ P	Int (+3 V), Ext	2, 3, 5	C, I, M	C I	CMOS, 14-Bit Complete DAC, Parallel or Serial Load	10.50
AD766	16	1.5	Serial, μ P	Int	1, 2	C, I, M	C I	Zero-Chip Interface 16-Bit DSP DACPORT	11.00
AD1851	16	1.5	Serial μ P	Int	2, 6	C	C I	16-Bit, $16 \times F_s$ PCM Audio DAC	6.98
AD1856	16	1.5	Serial, μ P	Int	2, 6	C	C I	16-Bit PCM Audio DAC	12.60
AD569	16	3.0	8/16, μ P	± 5 V, Ext (M)	1, 2	I, M	C I	Monolithic, 16-Bit Monotonic DAC	19.00
AD DAC71-V	16	5.0	16	6.3 V, Int	1, 7	C	C I	High Resolution 16-Bit DAC	50.00
AD DAC72-V	16	5.0	16	6.3 V, Int	1, 7	C, I	C I	High Resolution 16-Bit DAC	59.00
AD7846	16	6	16, μ P	Ext (M)	1, 2, 4, 5	C, I, M	C I	CMOS, 16-Bit Multiplying DAC with Readback Capability	19.00
*AD660	16	8	Serial, 8	10 V, Int	2, 3, 6	I, M	SF-90	Monolithic, Complete Serial/Byte I/P 16-Bit DAC	†
AD669	16	8	16, μ P	10 V, Int	2, 3, 6	I, M	C I	Monolithic, Complete 16-Bit DAC	16.00
DAC1136	16	8	16	6 V, Int	Module	C	C I	High Resolution and Accuracy	296.00
AD1147	16	20	16, μ P	10 V, Int	2	I	C I	Internal 8-Bit Latched Input DACs for Offset and Gain Adjust	†
AD1148	16	20	16, μ P	10 V, Int	2	I	C I	Separate 8-Bit Bus for Internal Offset and Gain Adjust DACs	160.00

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Volt Int/Ext (M) ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD1860	18	1.5	Serial	Int	2, 6	C	C I	18-Bit PCM Audio DAC	14.05
AD1861	18	1.5	Serial	Int	2, 6	C	C I	18-Bit, 16 \times F _s PCM Audio DAC	7.50
DAC1138	18	10	18	6 V, Int	Module	C	C I	High Resolution and Accuracy	993.00
AD1139	18	40	18, μ P	-10 V, Int	1	C	C I	True 18-Bit Accuracy	195.00

Video Graphics DACs

Model	Res Bits	Rate Update Rate MHz min	Palette Size	Reference	Package Options	Temp Range	Page	Comments	Price 100s \$
ADV476	6	66, 50, 35	256	V/I	2, 5	C	C I	CMOS, Triple 6-Bit Color Palette RAM-DAC	4.50
ADV7146	6/8	66, 50, 35	256	V/I	2, 5	C	C I	Pin Compatible to ADV476, INMOS 171/176 with CEG	†
ADV471	6	80, 66, 50, 35	256	V/I	5	C	C I	CMOS, Triple 6-Bit Color Palette RAM-DAC	4.80
ADV7141	6/8	80, 66, 50, 35	256	V/I	2, 5	C	C I	Pin Compatible to ADV471 with CEG	20.00
ADV477/ADV475	6/8	80, 66, 50, 35	256	V (Int.)	2, 5	C	C I	Low Power, Power Down RAM-DAC	†
ADV478	6/8	80, 66, 50, 35	256	V/I	5	C	C I	CMOS, Triple 8-Bit Color Palette RAM-DAC	10.00
ADV7148	6/8	80, 66, 50, 35	256	V/I	2, 5	C	C I	Pin Compatible to ADV478 with CEG	20.00
ADV453	8	66, 40	256	V	2, 5	C	C I	CMOS, Triple 8-Bit Color Palette RAM-DAC	35.00
ADV473	8	100, 80, 66, 50, 35	256	V/I (Int.)	5	C	C I	True-Color Video RAM-DAC (Triple 8-Bit)	†
ADV101	8	80, 50, 30	—	V	2, 5	C	C I	CMOS, Triple 8-Bit Video DAC	22.00
ADV7120	8	80, 50, 30	—	V	2, 5	C	C I	CMOS, Triple 8-Bit Video DAC	20.00
AD9701	8	225	—	—	1, 3, 4	I, M	C I	Single 8-Bit Video DAC	14.00
ADV7121	10	80, 50, 30	—	V	2, 5	C	C I	CMOS, Triple 10-Bit Video DAC	27.00
ADV7122	10	80, 50, 30	—	V	2, 5	C	C I	CMOS, Triple 10-Bit Video DAC	28.00
ADV7150	10	170, 135, 110, 85	256	V	10	C	C I	High Speed, True-Color Video RAM-DAC, (Triple 10-Bit) 4 \times 1 Multiplexing	†
ADV7151	10	170, 135, 110, 85	256	V	10	C	C I	High Speed, Pseudo-Color Video RAM-DAC, (Triple 10-Bit)	†
ADV7152	10	170, 135, 110, 85	256	V	10	C	C I	High Speed, Pseudo-Color Video RAM-DAC, (Triple 10-Bit) 2 \times 1 Multiplexing	†

¹This column lists the data format for the bus with "μP" indicating microprocessor capability—i.e., for a 12-bit converter 8/12, μP indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

²Ext indicates external reference with the range of voltages listed where applicable. Ext, M indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

Boldface type: Product recommended for new design.

DACPORT is a trademark of Analog Devices, Inc.

*New product.

†Consult factory for price.

Selection Guides

Digital-to-Analog Converters

Multiple DACs, Voltage Output

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Voltage Int/Ext ²	# of DACs	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7669	8	1.0	8, μ P	Int	2	2, 5, 6	C, I, M	C II	CMOS, Complete 8-Bit Dual DAC/ADC/SHA/Reference	9.50
DAC-8228	8	2.0	8, μ P	Ext (M)	2	2, 3, 6	I, M	C I	CMOS, PM-7528 Pinout with Voltage Output	3.95
DAC-8229	8	2.0	8, μ P	Ext (M)	2	2, 3, 6	I, M	C I	CMOS, Single or Dual Supply Operation	3.95
AD7769	8	2.5	8, μ P	Ext	2	2, 5	C, I	C II	CMOS, Complete 8-Bit Dual DAC/2-Channel ADC	12.50
DAC-8426	8	3.0	8, μ P	10 V, Int	4	2, 3, 6	I, M	C I	CMOS, Complete with 10 V Reference, Improved Timing	14.50
PM-7226A	8	3.0	8, μ P	Ext (M)	4	2, 3, 6	I, M	C I	CMOS, Improved Timing, Specified for +5 V to +15 V Operation	14.50
AD7226	8	3.0	8, μ P	2–12.5 V, Ext	8	2, 3, 4, 5, 6	C, I, M	C I	CMOS, No User Trims, Specified with Single or Dual Supplies	18.50
AD7225	8	5.0 (max)	8, μ P	2–12.5 V, Ext	4	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Separate References for Each DAC	32.00
DAC-8800	8	0.8	8, Serial	DC, Ext	8	2, 3, 6	C, I, M	C I	Octal 8-Bit CMOS DAC (TrimDAC®)	7.50
DAC-8840	8	3.5	Serial	Ext (M)	8	2, 3, 6	I, M	C I	CMOS, Four-Quadrant Multiplying TrimDACs with Op Amps, 8 Channel	9.95
DAC-8841	8	3.5	Serial	Ext (M)	8	2, 3, 6	I, M	C I	Octal 8-Bit, Two Quadrant, Multiplying TrimDAC, +5 V Operation	9.95
AD7228	8	5.0 (max)	8, μ P	2–10 V, Ext	8	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Specified for Single or Dual Supply, Skinny 20-Pin DIP	32.00
AD7228A	8	5.0 (max)	8, μ P	2–10 V, Ext	8	2, 3, 5, 6	C, I, M	C I	CMOS, Specified for Single or Dual Supply, Skinny 20-Pin DIP	†
AD75004	12	2	8, μ P	5 V, Int	4	2, 5	C	C I	Fastest Quad 12-Bit Voltage Output DACPORT	34.50
AD7242	12	2	Serial, μ P	3 V, Int	2	2, 3, 6	C, I	C I	Complete ± 5 V 12-Bit Dual DAC	14.00
AD392	12	4	12, μ P	Int	4	8	C	C I	Fast Bus Access Time (<40 ns), Data Readback Capability	102.00
AD390	12	4	12, μ P	10 V, Int	4	1	C, M	C I	Double Buffered, Simultaneous Update	127.10
AD7837	12	5	8, μ P	Ext (M)	2	2, 3, 6	C, I, M	C I	CMOS, MDAC, Byte Load, Double Buffered	15.00
AD7847	12	5	12, μ P	Ext (M)	2	2, 3, 6	C, I, M	C I	CMOS MDAC, Parallel Load	15.00
DAC-8412	12	6	12, μ P	Ext	4	1, 2, 3, 4, 5	I, M	C I	Readback, Reset to Midscale, Low Power Quad DAC, +5 V to ± 15 V Operation	34.50
DAC-8413	12	6	12, μ P	Ext	4	1, 2, 3, 4, 5	I, M	C I	Equivalent to DAC-8412 with Reset to Zero Scale	34.50
*DAC-8420	12	6	Serial	Ext	4	2, 3, 6	I, M	SF-90	BiCMOS, Equivalent to 8412/8413 with Serial Interface in 16-Pin Package	29.95

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Voltage Int/Ext ²	# of DACs	Package Options	Temp Range	Page	Comments	Price 100s \$
AD75069	12	8	12	5 V, Int	8	5, 14	C, I	C I	Monolithic Octal 12-Bit Voltage Output DACPORT	70.00
AD7237	12	10 (max)	8, μ P	Int (+5 V), Ext	2	2, 3, 6	C, I, M	C I	CMOS, Complete 12-Bit Dual DAC, Byte Load	15.00
AD7247	12	10 (max)	12, μ P	Int (+5 V), Ext	2	2, 3, 6	C, I, M	C I	CMOS, Complete 12-Bit Dual DAC, Parallel Load	15.00
AD664	12	10	12, μ P	Ext (M)	4	1, 2, 4, 5	C, I, M	C I	Readback, Reset, Low Power Quad DAC	34.50
AD394	12	10	12, μ P	Ext (M)	4	1	C, M	C I	Four Independent Reference Inputs, Bipolar Outputs	120.80
AD395	12	10	12, μ P	Ext (M)	4	1	C, M	C I	Four Independent Reference Inputs, Unipolar Outputs	120.80
AD7244	14	2	Serial, μ P	+3 V, Int	2	2, 3, 6	C, I, M	C I	Complete ± 5 V 14-Bit Dual DAC	17.95
AD396	14	10	8, μ P	Ext (M)	4	1	C, M	C I	Four Independent Reference Inputs, Bipolar Output, Simultaneous Update	168.10
AD1866	16	1.5	Serial	Int	2	2, 6	I	C I	Dual 16-Bit Audio DAC, +5 V Single Supply	10.50
AD1864	18	1.5	Serial	Int	2	2, 5	C	C I	Dual 18-Bit Audio DAC	20.45
AD1865	18	1.5	Serial	Int	2	2, 6	C	C I	Dual 18-Bit, $16 \times F_S$ PCM Audio DAC	14.85
AD1868	18	1.5	Serial	Int	2	2, 6	C	C I	Dual 18-Bit Audio DAC, +5 V Single Supply	11.70

¹This column lists the data format for the bus with " μ P" indicating microprocessor capability — i.e., for a 12-bit converter 8 12- μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

²Ext indicates external reference with the range of voltages listed where applicable. Ext M indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

Boldface type: Product recommended for new design.

TrimDAC is a registered trademark of Analog Devices, Inc.

*New product.

†Consult factory for price.

Selection Guides

Digital-to-Analog Converters

Multiple DACs, Current Output

Model	Res Bits	Settling Time μ s typ	Bus Interface Bits ¹	Reference Voltage Int/Ext ²	# of DACs	Package Options	Temp Range	Page	Comments	Price 100s \$
PM7528	8	0.18	8, μ P	Ext (M)	2	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Single Supply Operation, TTL Compatible at $V_{DD} = +5$ V	3.50
AD7528	8	0.18	8, μ P	Ext (M)	2	2, 3, 4, 5, 6	C, I, M	C I	CMOS, +5 V to +15 V Operation, TTL Compatible at $V_{DD} = +5$ V	5.95
DAC-8408	8	0.19	8, μ P	Ext (M)	4	2, 3, 5, 6	C, I, M	C I	CMOS, Data Readback Memory Function, Separate V_{REF}	8.03
PM-7628	8	0.20	8, μ P	Ext (M)	2	2, 3, 4, 5, 6	I, M	C I	CMOS, +5 V or +15 V Operation, Improved Timing	3.50
AD7628	8	0.35	8, μ P	Ext (M)	2	2, 3, 4, 5, 6	C, I, M	C I	CMOS, +12 V to +15 V Operation, TTL Compatible at $V_{DD} = 12$ V to 15 V	2.45
DAC-8221	12	0.45	12, μ P	Ext (M)	2	2, 3, 4, 6	C, I, M	C I	CMOS, Buffered Inputs, +5 V Operation	10.88
AD7564	12	0.2	Serial, μ P	Ext (M)	4	6	I	C I	Single +5 V Supply, Separate References, 28-Pin SOIC Package	†
AD7568	12	0.2	Serial, μ P	Ext (M)	8	10	I	C I	Single +5 V Supply, Separate References, 44-Pin PQFP	28.00
DAC-8212	12	1.0 (max)	12	Ext (M)	2	2, 3, 5	C, I, M	C I	CMOS, +5 V or +15 V Single Supply Operation	13.05
DAC-8222	12	1.0 (max)	12, μ P	Ext (M)	2	2, 3, 4, 6	C, I, M	C I	CMOS, Double Buffered Inputs, Parallel Load	11.60
DAC-8248	12	1.0 (max)	8, μ P	Ext (M)	2	2, 3, 6	C, I, M	C I	CMOS, Double Buffered Inputs, Byte Load	11.60
AD7537	12	1.5 (max)	8, μ P	Ext (M)	2	2, 3, 4, 5	C, I, M	C I	CMOS, Byte Load, Double Buffered	14.50
AD7547	12	1.5 (max)	12, μ P	Ext (M)	2	2, 3, 4, 5, 6	C, I, M	C I	CMOS, Parallel Load	14.50
AD7549	12	1.5 (max)	4, μ P	Ext (M)	2	2, 3, 4, 5	C, I, M	C I	CMOS, Nibble Load, Double Buffered	16.95
AD1864	18		Serial, μ P	Int	2	2, 5	C	C I	Dual 18-Bit Audio DAC	20.45
AD1865	18		Serial, μ P	Int	2	2	C	C I	Dual 18-Bit, $16 \times F_s$ PCM Audio DAC	14.85

LOGDACs®

Model	Res dB	Full-Scale Range dB	Accuracy dB	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7111	0.375	88.5	0.17	2, 3, 4, 6	C, I, M	C I	Low Distortion	16.80
AD7118	1.5	88.5	0.35	2, 3, 4, 5, 6	C, I, M	C I	CMOS	7.85

Analog-to-Digital Converters

High Speed ADCs

Model	Res Bits	Through-put Rate MSPS min	Full Power BW MHz typ	Bus Interface Bits ¹	Reference Voltage Int/Ext ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9006	6	470	550	6, μ P	± 1 V, Ext	4, 12	C, M	C II	470 MSPS, 6-Bit ADC; 8.0 pF Input Capacitance	200.00
AD9016	6	550		Dual 6, μ P	± 1 V, Ext	4, 12	C, M	C II	AD9006 with 1:2 Demultiplexed Data Output Demultiplexing Circuitry	200.00
AD9000	6	50	20	6	0.5–2 V, Ext	1, 3	C, M	C II	MIL-STD-883, Rev. C, Devices Available; Low Error Rate	40.00
AD9028	8	300	250	8	–2 V, Ext	4	C, M	C II	300 MSPS, 8-Bit ADC, Guaranteed Dynamic Performance	185.00
AD9038	8	300	250	Dual 8	–2 V, Ext	4	C, M	C II	AD9028 with On-Board 1:2 Demultiplexed Data Outputs	185.00
AD770	8	200	250	8	± 2 V, Ext	1	C, M	C II	High Bandwidth, Error Correction	150.00
AD9002	8	125	160	8	0.1–(–2.1) Ext	1, 4	I, M	C II	Single Supply, Low Power, Low Input Capacitance, MIL-STD-883, Rev. C Device Available	90.00
AD9012	8	75	160	8	–2 V, Ext	3, 4	I, M	C II	TTL Outputs, Low Power, Low Input Cap	70.00
AD9058	8	50	175	8	+2 V, Int	1, 5, 14	C, M	C II	Dual 8-Bit, TTL Output	29.00
AD9048	8	35	15	8, μ P	–2 V, Ext	2, 3, 5, 12	C, M	C II	35 MSPS, 8-Bit Video ADC, 16 pF Input Capacitance	54.00
AD9020	10	60	175	10	± 1.75 V, Ext	4, 12	C, M	C II	Fastest 10-Bit TTL Monolithic ADC	165.00
AD9060	10	75	175	10	± 1.75 V, Ext	4, 12	C, M	C II	Fastest 10-Bit ECL Monolithic ADC	185.00
AD773	10	18	75	10	+2.5, Ext	1	C, M	C II	Low Power, 10-Bit 18 MSPS with On-Chip T/H	55.00
AD9032	12	25	150	12	Int	8	C, M	C II	World's Fastest Complete 12-Bit ADC	1000.00
AD9034	12	20	150	12	Int	8	C, M	C II	20 Ms	715.00
AD9005A	12	10	38	12	Int	8	C, M	C II	Complete 12-Bit ADC with T/H, Reference and Timing Circuitry	925.00
*AD9007	12	10	—	12	Int	8	C	SF-90	± 5 V Only Version of AD9005A	
AD1671	12	1.25	2	12	2.5 V, Int	1, 3, 5	C, I, M	C II	Complete, Monolithic 12-Bit, 1.25 MSPS ADC	420.00
AD9003A	12	1	10	12	Int	8	C	C II	12-Bit, 1 MSPS ADC	55.00
AD7886	12	.75	1	12, μ P	+5 V, Ext	1, 2, 5	C, I, M	C II	CMOS, 12-Bit 750 kSPS Sampling ADC	119.00
AD9014	14	10	60	14	Int	Board	C	C II	Wide Spurious Free Dynamic Range	2750.00

¹This column lists the data format for the bus with “ μ P” indicating microprocessor capability —i.e., for a 12-bit converter 8/12. μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

²Ext indicates external reference with the range of voltages listed where applicable. Ext (M) indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

Boldface Type: Product recommended for new design.

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*New product.

†Consult factory for price.

Selection Guides

Analog-to-Digital Converters

Sampling ADCs

Model	Res Bits	Through-put Rate kSPS max	SHA BW kHz typ ¹	Reference Volt Int/Ext ²	Bus Interface Bits ³	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7821	8	1000	100	0-5 V, Ext	8, μ P	2, 3, 4, 5, 6	I, M	C II	CMOS, Bipolar or Unipolar Operation	9.95
AD7820	8	500	14	0-5 V, Ext	8, μ P	2, 3, 4, 5, 6	I, M	C II	CMOS, 8-Bit Sampling ADC	9.95
AD7569	8	400	200	Int	8, μ P	2, 3, 4, 5, 6	C, I, M	C II	CMOS, Complete I/O Port with DAC, ADC, SHA, Amps and Reference	6.00
AD7669	8	400	200	Int	8, μ P	2, 5, 6	C, I, M	C II	CMOS, Complete I/O Port with 2 DACs, ADC, SHA, Amps and Reference	9.50
AD7769	8	400	200	Ext	8, μ P	2, 5	C	C II	CMOS, Complete 2-Channel I/O Port with Input/Output Signal Conditioning	12.50
AD7824	8	400	10	0-5 V, Ext	8, μ P	2, 3, 6	C, I, M	C II	CMOS, 4-Channel, 8-Bit Sampling ADC	10.45
AD7828	8	400	10	0-5 V, Ext	8, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, 8-Channel, 8-Bit Sampling ADC	10.95
AD7575	8	190	50	1.23 V, Ext	8, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, Low Cost	5.50
AD7776	10	500	50	2.0 V, Int/Ext	10, μ P	2, 6	C, I	C II	CMOS, Single Channel Complete Sampling ADC, Single Supply, Twos Complement Output Code	†
AD7777	10	500	50	2.0 V, Int/Ext	10, μ P	2, 6	C, I	C II	CMOS, 4-Channel Complete ADC for Single or Simultaneous Dual Channel Sampling, Single Supply	†
AD7778	10	500	50	2.0 V, Int/Ext	10, μ P	10	C, I	C II	CMOS, 8-Channel Complete ADC for Single or Simultaneous Dual Channel Sampling, Single Supply	†
AD7579	10	50	25	2.5 V, Ext	8, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, Low Cost 10-Bit Sampling ADC	9.00
AD7580	10	50	25	2.5 V, Ext	10, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, Low Cost 10-Bit Sampling ADC	9.00
AD1671	12	1250	2000	2.5 V, Int	12	1, 3, 5	C, I, M	C II	Complete, Monolithic 12-Bit, 1.25 MSPS ADC	55.00
AD9003	12	1000	10000	Int	12	8	C	C II	12-Bit, 1 MSPS ADC, Single 40-Pin DIP	119.00
AD7886	12	750	1000	5 V, Ext	12, μ P	2, 3, 5	C, I	C II	CMOS, 12-Bit 750 kSPS Sampling ADC	55.00
AD678	12	200	1000	5 V, Int	8/12, μ P	1, 2, 14	C, I, M	C II	BiMOS, High Impedance High Bandwidth Sampling Input, 10 V Range, AC/DC Tested	27.00
AD1341	12	150	150	10 V, Int	16, μ P	12	C, M	C II	High Speed 8/16 Channel DAS	198.00
AD7893	12	140	70	2.5 V, Ext	Serial	2, 3, 6	I, M	C II	CMOS, Single Supply Sampling ADC in 8-Pin Package	†
AD7892	12	140	70	2.5 V, Ext	12/Serial, μ P	2, 3, 6	I, M	C II	± 10 V Input, Single Supply Sampling ADC	†
AD1332	12	125	125	-5 V, Int	12, μ P	1	I, M	C II	Complete 12-Bit 125 kHz Sampling ADC for Digital Signal Processing, On-Chip FIFO	142.80
AD7874	12	29	500	Int (+3 V), Ext	12, μ P	2, 3, 4, 6	C, I, M	C II	CMOS, Simultaneous Sampling 4-Channel ADC for ± 10 V Input Signals	28.00
AD7870	12	100	500	3 V, Int	8/12/Serial, μ P	2, 3, 5	C, I, M	C II	CMOS, 100 kHz Throughput, ± 3 V Input	18.00
AD7875	12	100	500	3 V, Int	8/12/Serial, μ P	2, 3, 5	C, I, M	C II	CMOS 100 kHz Throughput, 0-5 V Input	22.00
AD7876	12	100	500	3 V, Int	8/12/Serial, μ P	2, 3, 6	I, M	C II	CMOS, 100 kHz Throughput, ± 10 V Input	18.00
AD7878	12	100	500	3 V, Int	12, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, 100 kHz Throughput, ± 3 V Input, On-Chip FIFO	28.00
AD1674	12	100	500	10 V, Int	8/12, μ P	1, 2, 6	C, I, M	C II	Complete AD574A Pinout Compatible, Sampling Input, AC/DC Tested	14.15
AD7890	12	100	50	2.5 V, Ext	Serial	2, 3, 6	I, M	C II	± 10 V Input 8-Channel Single Supply Sampling ADC	†
AD7891	12	100	50	2.5 V, Ext	12, μ P	10	I, M	C II	± 10 V Input 8-Channel Single Supply Sampling ADC	†

Model	Res Bits	Through-put Rate kSPS max	SHA BW kHz typ ¹	Reference Volt Int/Ext ²	Bus Interface Bits ³	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7868	12	83	500	3 V, Int	Serial, μ P	2, 3, 6	I, M	C II	CMOS, Complete I/O Port with 12-Bit ADC and 12-Bit DAC	24.00
AD1334	12	67	235	-5 V, Int	12, μ P	I	I, M	C II	Four-Channel 67 kHz 12-Bit Sampling ADC, On-Chip FIFO	180.00
AD7880	12	66	33	5 V, Ext	12, μ P	2, 3, 6	I	C II	Single +5 V Supply, Low Power Shutdown	14.00
AD368	12	50	40-1000	6.3 V, Int	12	1	I, M	C II	Complete 12-Bit ADC, PGA with Gains of 1, 8, 64, 512	102.90
AD369	12	50	40-1000	6.3 V, Int	12	1	I, M	C II	Complete 12-Bit ADC, PGA with Gains of 1, 10, 100, 500	112.40
AD363R	12	25		10 V, Int	12, μ P	1	C, M	C II	16-Channel, 12-Bit DAS	270.00
AD364R	12	20		10 V, Int	12, μ P	1	C, M	C II	High Speed, 16-Channel, 12-Bit DAS with Three-State Buffered Output	168.10
AD679	14	128	1000	5 V, Int	8, μ P	1, 2, 14	C, I, M	C II	BiMOS, High Impedance, High Bandwidth Sampling Input, 10 V Input Range, AC/DC Tested	29.70
AD779	14	128	1000	5 V, Int	14, μ P	1, 2, 14	C, I, M	C II	BiMOS, High Impedance, High Bandwidth Sampling Input, 10 V Input Range, AC/DC Tested	29.70
AD7869	14	83	500	3 V, Int	Serial	2, 3, 6	C, I	C II	CMOS, Complete I/O Port with 14-Bit DAC and 14-Bit ADC	32.00
AD7871	14	83	500	3 V, Int	8/14/Serial, μ P	2, 3, 5	C, I, M	C II	CMOS, Complete Sampling ADC, ± 3 V Input	29.70
AD7872	14	83	500	3 V, Int	Serial, μ P	2, 3, 6	C, I, M	C II	CMOS, Complete, Serial Interface, 16-Pin DIP/SOIC	28.00
DAS1152	14	25	X	10 V, Int	14	Module	I	C II	14-Bit High Accuracy Sampling ADC	254.00
DAS1157	14	18	X	10 V, Int	14	Module	I	C II	Low Power Sampling ADC	254.00
DAS1153	15	20	X	10 V, Int	15	Module	I	C II	15-Bit High Accuracy Sampling ADC	317.00
DAS1158	15	18	X	10 V, Int	15	Module	I	C II	Low Power, 15-Bit Sampling ADC	305.00
AD1382	16	500	2200	10 V, Int	8, μ P	1	C	C II	High Speed, Guaranteed Dynamic Performance	595.00
AD1385	16	500	2200	10 V, Int	8, μ P	1	C, M	C II	Similar to AD1382 with Autocalibration Ability, Guaranteed Dynamic Performance	697.00
AD7884	16	166	83	3 V, Ext	16, μ P	2, 3, 5	I, M	C II	CMOS, Low Power (250 mW), 5.3 μ s Conversion	†
AD7885	16	166	83	3 V, Ext	8, μ P	2, 3, 5	I, M	C II	Similar to AD7884, 28-Pin Package, Byte Output	†
AD1876	16	100	1000	3-7 V, Ext	Serial	2	C	C II	Autocalibrating, 16-Pin DIP ADC, AC Tested	33.00
AD675	16	100	1000	3-10 V, Ext	8/Serial, μ P	1, 2	C, I, M	C II	Autocalibrating, 24-Pin Narrow DIP ADC, AC/DC Tested	39.00
AD676	16	100	1000	3-10 V, Ext	16	1, 2	C, I, M	C II	Similar to AD675 but in 28-Pin DIP, Parallel Output	39.00
*AD677	16	100	1000	3-10 V, Ext	Serial	1, 2, 6	C, I, M	SF-91	Similar to AD675 but in 16-Pin Narrow DIP, Serial Output	35.00
AD1380	16	50	900	Int	16/Serial	1	C	C II	16-Bit Sampling ADC	152.00
DAS1159	16	18	X	10 V, Int	16	Module	I	C II	Low Power, 16-Bit Sampling ADC	†

¹X indicates that the internal SHA bandwidth is not specified in kHz.

²Ext indicates external reference with the range of voltages listed where applicable. Ext (M) indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

³This column lists the data format for the bus with " μ P" indicating microprocessor capability—e.g., for a 12-bit converter 8/12, μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

Selection Guides

Analog-to-Digital Converters

Nonsampling ADCs

Model	Res Bits	Conv Rate μ s max	Reference Voltage Int/Ext ¹	Bus Interface Bits ²	Package Options	Temp Range	Page	Comments	Price 100s \$
ADC-908	8	6.0	-10 V, Ext	8, μ P	2, 3, 4, 6	C, I, M	C II	CMOS, +5 V Operation, Fast	7.50
AD670	8	10	Int	8, μ P	1, 2, 4, 5	C, I, M	C II	Single +5 V Supply, Including In-Amp and Reference	7.90
AD7576	8	10	1.23 V, Ext	8, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, Low Cost, Single Supply	5.10
PM-7574	8	15.0	-10 V, Ext	8, μ P	2, 3, 4, 6	C, I, M	C II	CMOS, +5 V Operation	6.00
AD7574	8	15	-10 V, Ext	8, μ P	2, 3	C, I, M	C II	CMOS, +5 V Operation	7.50
AD570	8	25	Int	8	1	C, M	C II		24.10
AD673	8	30	Int	8, μ P	1, 2, 5	C, M	C II		8.30
AD7581	8	66.7	-5 V to (-15 V), Ext	8, μ P	2, 3, 5	C, I	C II	CMOS 8-Bit ADC	13.90
AD579	10	1.8	10 V, Int	10/Serial	1	C, M	C II	High Speed with Low Power	119.80
ADC-910	10	6.0	2.5 V, Int	8, 10, μ P	3	C, I, M	C II	Bipolar, Fast with Byte Output	18.45
AD571	10	25	Int	10	1	C, M	C II	Complete 10-Bit ADC	35.15
AD573	10	30	Int	8/10, μ P	1, 2, 5	C, M	C II	Complete 10-Bit ADC, Byte or Parallel Interface	14.60
AD575	10	30	Int	Serial	1, 2	C, M	C II	Complete 10-Bit ADC with Serial Interface	14.00
AD671-500	12	0.5	5 V, Ext	12	1, 2	C, M	C II	12-Bit 500 ns Monolithic ADC	75.00
AD671-750	12	0.75	5 V, Ext	12	1, 2	C, M	C II	12-Bit 750 ns Monolithic ADC	75.00
AD7586	12	1	-4 V, Ext	12, μ P	2, 3, 5	C, I, M	C II	CMOS 12-Bit, 1 MHz ADC	49.95
AD578	12	3	10 V, Int	12	1	C, M	C II	Complete, 3 μ s, 12-Bit ADC	122.15
AD7572A	12	3	Int	8/12, μ P	2, 3, 6	C, I, M	C II	Improved Version of Industry Standard	14.00
AD7672	12	3	-5 V, Ext	12, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, Unipolar or Bipolar, -12 V, +5 V Supply	33.00
AD5240	12	5	6.3 V, Int	12	1	C, M	C II	Industry Standard	207.00
AD7572	12	5	-5.25 V, Int	8/12, μ P	2, 3, 4, 5	C, I, M	C II	CMOS 12-Bit ADC	35.00
ADC-170	12	5.6	-5.25 V, Ext	Serial	2, 3, 6	I, M	C II	Complete, 3 μ s, 12-Bit ADC in 8-Pin Mini-DIP	14.95
AD774B	12	8	10 V, Int	8/12, μ P	1, 2, 6	C, I, M	C II	Faster Version of AD674B with 8 μ s Conversion; Industry Standard	25.70
AD ADC84/85	12	10	6.3 V, Int	12	1	C, I, M	C II	Industry Standard	73.00
ADC-912A	12	10	-5 V, Ext	12, μ P	2, 3, 6	I, M	C II	CMOS, Improved Version of ADC-912	12.00
ADC-912	12	12.5	-5 V, Ext	12, μ P	2, 3, 6	C	C II	CMOS, Low Transition Noise	12.00
AD5210	12	13	-10 V, Int/Ext	12	1	I, M	C II	Industry Standard (AD5211/12/14/15)	158.00
AD674A	12	15	10 V, Int	8/12, μ P	1	C, M	C II	Complete 12-Bit ADC, Industry Standard Pinout	39.25
AD674B	12	15	10 V, Int	8/12, μ P	1, 2, 6	C, I, M	C II	Improved Monolithic Version of AD674A and AD574A; Industry Standard	23.40
AD572	12	25	10 V, Int	12	1	I, M	C II	12-Bit Successive Approximation ADC	116.60
AD ADC80	12	30	6.3 V, Int	12	1	I	C II	Industry Standard	51.00
AD574A	12	35	10 V, Int	8/12, μ P	1, 2, 4, 5	C, M	C II	Complete ADC with Reference and Clock; Industry Standard	22.60
AD5200	12	50	-10 V, Int/Ext	12	1	I, M	C II	Industry Standard (AD5201/02/04/05)	147.00
AD7578	12	100	5 V, Ext	8, μ P	1, 2	C, I, M	C II	CMOS, 1 LSB Total Unadjusted Error	19.95

Model	Res Bits	Conv Rate μ s max	Reference Voltage Int/Ext ¹	Bus Interface Bits ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7582	12	100	5 V, Ext	8, μP	1, 2, 5	C, I, M	C II	CMOS, 4 Channel, 1 LSB Total Unadjusted Error	22.95
AD1377	16	10	Int	16, Serial	1	C	C II	Complete, High Speed 16-Bit ADC Operation over -25°C to $+85^{\circ}\text{C}$	116.00
AD1376	16	17	Int	16, Serial	1	C	C II	Complete 16-Bit Converter; Industry Standard Pinout	103.00
AD1378	16	17	Int	16, Serial	1	M	C II	Complete 16-Bit Converter; MIL Temp Range; Industry Standard Pinout	142.00
ADC1140	16	35	10 V, Int	16	Module	C	C II	16-Bit ADC, Operates over -25°C to $+85^{\circ}\text{C}$ Temperature Range	180.00
AD ADC71	16	50	6.3 V, Int	16	1	C	C II	Industry Standard	66.00
AD ADC72	16	50	6.3 V, Int	16	1	C, I	C II	Industry Standard	140.00
AD1170	18	1000	5 V, Int	8	2	C	C II	7 to 22-Bit Programmable Integrating ADC	103.00

¹Ext indicates external reference with the range of voltages listed where applicable. Ext (M) indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

²This column lists the data format for the bus with " μ P" indicating microprocessor capability—i.e., for a 13-bit converter 8/12, μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

Boldface Type: Product recommended for new design.

*New product.

Selection Guides

Analog-to-Digital Converters

Sigma-Delta ADCs

Model	Res Bits	Input BW kHz	Through-put Rate kHz	Reference Voltage Int/Ext ¹	Bus Interface Bits ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD776	16	50	100 to 400	2 V, Int	Serial	1	I	C II	16-Bit 100 kSPS Oversampling ADC, Single Supply	†
AD1878	16	24	2.5 to 50	3 V, Int	Serial	2	C	C II	Similar to AD1879 with 16-Bit Resolution	†
AD7701	16	10 Hz	4	2.5 V, Ext	Serial, μ P	2, 3, 6	I, M	C II	16-Bit Sigma-Delta ADC, 0.1–10 Hz Input Bandwidth	15.00
AD28msp02	16	4	8	2.5, Ext	Serial, μ P	6	C	C I	Complete Voice Band Linear Codec with On-Chip Filtering, Single Supply	†
AD28msp01	16	3.4	7.2/8.0/9.6	2.5, Ext	Serial, μ P	6	C	C I	Complete Analog Front End for High Performance, DSP-Based Modems, Single Supply	†
AD1879	18	24	2.5 to 50	3 V, Int	Serial	2	C	C II	Dual Channel, High Performance Stereo 18-Bit Oversampled ADC	†
AD7716	20	18.5 to 300 Hz	0.075 to 1.145	2.5 V, Int	Serial	2, 6	C	C II	Quad 20-Bit Sigma Delta ADC, Low Power with BW up to 300 Hz	†
AD7703	20	10 Hz	4	2.5 V, Ext	Serial, μ P	2, 3, 6	I, M	C II	20-Bit Sigma-Delta ADC, 0.1–10 Hz Input Bandwidth	18.50
AD7710	21	2.62 to 262 Hz	0.01 to 1.0	2.5 V, Int	Serial, μ P	2, 3, 6	I, M	C II	24-Bit Sigma-Delta Signal Conditioning ADC with 2 Differential Input Channels	†
AD7711	21	2.62 to 262 Hz	0.01 to 1.0	2.5 V, Int	Serial, μ P	2, 3, 6	I, M	C II	Similar to AD7710 but 24-Bit Sigma-Delta ADC with 1 Differential, 1 Single-Ended Input and RTD Current Sources	†
AD7712	21	2.62 to 262 Hz	0.01 to 1.0	2.5 V, Int	Serial, μ P	2, 3, 6	I, M	C II	24-Bit ADC with 1 Differential Input Channel and 1 High Voltage Input Channel	†
AD7713	21	0.52 to 52.4 Hz	2.0 to 200 Hz	2.5 V, Ext	Serial, μ P	2, 3, 6	I, M	C II	Loop Powered 24-Bit Sigma-Delta Signal Conditioning ADC	†
*AD1849	16	8 to 48 Hz	8 to 48 Hz	2.25 V, Int	Serial	5	C	SF-91	16-Bit SOUNDPORT™ Stereo Codec. Stereo ADCs and Stereo DACs, PGA, Attenuator and All Filters. Operates on +5 V Supplies.	†

Multiplexed ADCs

Model	Res Bits	# Chan	Conv Time μ s	SHA BW kHz	Reference Volt Int/Ext ¹	Bus Interface Bits ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7769	8	2	2.5	200	Ext	8, μ P	2, 5	C	C II	CMOS, Complete 2-Channel I/O Port with Input/Output Signal Conditioning	12.50
AD7824	8	4	2.5	10	0–5 V, Ext	8, μ P	2, 3, 6	C, I, M	C II	CMOS, On-Chip Track-Hold	10.45
AD7828	8	8	2.5	10	0–5 V, Ext	8, μ P	2, 3, 4, 5	C, I, M	C II	CMOS, On-Chip Track-Hold	10.95
AD7581	8	8	66.7		–10 V, Ext	8, μ P	2, 3, 5	C, I	C II	CMOS, 8-Channel DAS	13.90
AD1341	12	8/16	6.67		10 V, Int	16, μ P	12	C, M	C II	High Speed, 16-Channel Programmable 12-Bit DAS with 25 ns Bus Interface	198.00
AD1334	12	4	15	235	–5 V, Int	12, μ P	1	I, M	C II	Four-Channel 65 kHz 12-Bit Sampling ADC for Digital Signal Processing, On-Chip FIFO	180.00
AD7874	12	4	32.5 (for 4 Channels)	500	3 V Int	12, μ P	2, 3, 6	C, I, M	C II	CMOS, Simultaneous Sampling Four-Channel 29 kHz ADC for ± 10 V Input Signals	28.00
AD363R	12	8/16	40		10 V, Int	12, μ P	1	C, M	C II	High Speed, 16-Channel, 12-Bit DAS	270.00
AD364R	12	8/16	50		10 V, Int	12, μ P	1	C, M	C II	16-Channel, 12-Bit DAS with Three-State Buffers	168.00
AD7582	12	4	100		4 V–6 V, Ext	12, μ P	1, 2, 5	C, I, M	C II	CMOS, 1 LSB Total Unadjusted Error	22.95
AD7890	12	8	10	500	2.5 V, Ext	Serial, μ P	2, 3, 6	I, M	C II	CMOS, 8-Channel Multiplexed ADC for ± 10 V Input Signals	†
AD7891	12	8	10	500	2.5 V, Ext	12, μ P	10	I, M	C II	CMOS, 8-Channel Multiplexed ADC for ± 10 V Input Signals	†

¹Ext indicates external reference with the range of voltages listed where applicable. Ext (M) indicates external reference with multiplying capability. Int indicates reference is internal. A voltage value is given if the reference is pinned out.

²This column lists the data format for the bus with “ μ P” indicating microprocessor capability—i.e., for a 12-bit converter 8/12, μ P indicates that the data can be formatted for an 8-bit bus or can be in parallel (12 bits) and is microprocessor compatible.

Boldface Type: Product recommended for new design.

SOUNDPORT is a trademark of Analog Devices, Inc.

*New product.

†Consult factory for price.

Selection Guides

V/F and F/V Converters

Voltage-to-Frequency Converters

Model	Full-Scale Frequency MHz	Linearity % max	FS Calib Error % typ	Output Format	Input Range V	Package Options	Temp Range	Page	Comments	Price 100s \$
AD652	2	0.005–0.05	0.25–0.5	Pulse Train	0 to 10, ± 5 0 to -10	3, 4, 5	C, I, M	C II	Synchronous, Multiple Input Ranges, Low Linearity, Single Supply	8.75
AD650	1	0.005–0.1	5–10	Pulse Train	0 to 10, ± 5 0 to -10	1, 2, 5	C, I, M	C II	Low Nonlinearity, Multiple Input Ranges	7.95
AD654	0.5	0.1–0.4	10	Square Wave	0 to (V_S)	2, 6	C	C II	Single Supply, Low Cost	3.30
ADVFC32	0.5	0.01–0.2	5	Pulse Train	0 to 10	2, 7	C, I, M	C II	Industry Standard	6.05
AD537	0.15	0.07–0.25	5	Square Wave	$-V_S$ to $(+V_S - 4)$	1, 7	C, M	C II	Single Supply, Military Grade	20.10

Frequency-to-Voltage Converters

Model	Linearity Input Range kHz	Response Time % max	ms typ	Package Options	Temp Range	Page	Comments	Price 100s \$
451	0 to 10	0.03–0.008	4	Module	I	C I, C II	Complete, No External Components	72.00
453	0 to 100	0.03–0.008	0.8	Module	I	C I, C II	Complete, No External Components	83.00
AD650	0 to 1000	0.005–0.1	–	1, 2, 5	C, I, M	C II	Low Nonlinearity	7.95
ADVFC32	0 to 500	0.01–0.2	–	2, 7	C, I, M	C II	Industry Standard	6.05

Motion Control Products

Digital-to-Synchro and Resolver Converters

Model	Res Bits	Output Format ¹	Accuracy arc mins	Load Driving Capability	Reference Frequency Options Hz	Reference Input Volt Options V rms	Signal Output Volt Options V rms	Transformer Output Isolations	Package Options	Temp Range	Page	Comments	Price Single Piece \$
DRC1745	14	R ²	±1, ±2, ±3	2.0VA ⁴	dc→2600	0→3.4	0→6.8	Use Ext. STM 1680 and STM 1683 Transformer	8	M	C I	Digital-to-Resolver Converter with Int. 2 VA Power Amplifier. Optional Int. TransZorb [‡] Protection. 2 Byte Latched Inputs	614.00
AD2S65	14	R	±2, ±4 ³	—	dc→2600	0→3.4	0→6.8	—	8	C, M	C I	Digital-to-Resolver Converter. Autonulling (AN) Option	283.00
DRC1746	16	R ²	±1, ±2, ±3	2.0VA ⁴	dc→2600	0→3.4	0→6.8	Use Ext. STM 1680 and STM 1683 Transformer	8	M	C I	16-Bit Version of DRC1745	687.00
AD2S66	16	R	±1, ±2, ±4 ³	—	dc→2600	0→3.4	0→6.8	—	8	C, M	C I	Digital-to-Resolver Converter. Autonulling (AN) Option	397.00

Motor Control

Model	Description	Package Options	Temp Range	Page	Comments	Price
AD2S100	AC Vector Controller	15	I	C I	Vector Coordinate Transformation, 15 arc min, 2 μs Settling Time	†

Synchro/Resolver Support Components

Model	Description	Package Options	Temp Range	Page	Comments	Price \$
AD2S75	Signal and Reference Isolation for AD2S80/81/82	8	C, M	C I	56–20,000 Hz Freq, 11.8–115 V rms Ref, 11.8/26/90 V rms Input	150.00
AD2S99	Monolithic Sine Wave Oscillator Reference	5	I	C I	2.0–20 kHz Frequency range, Phase Shift Compensation	†
OSC1758	Hybrid Sine/Cosine Power Oscillator	8	C, M	C I	0.0–10 kHz Frequency Range, In-phase and Quadrature Outputs, 1.5 W Output Power	117.00

¹S = Synchro; R = Resolver.

²Synchro format output with external output transformer STM1683.

³Depends on option.

⁴Can be used with pulsating power supply for reduced dissipation.

Boldface type: product recommended for new design.

*New product.

†Consult factory for price.

‡TransZorb is a trademark of General Semiconductor Industries, Inc.



Synchro, Resolver, Inductosyn† and LVDT-to-Digital Converters

Model	Res Bits	Input Format ¹	Accuracy arc mins	Tracking Rate Options revs/sec ²	Reference Frequency Options Hz	Input Isol	Package Options	Temp Range	Page	Comments	Price Single Piece \$
SDC/RDC1741	12	S, R	±15.3	18	400, 2.6 k	Yes	8	C, M	C I	Tristate, Latched Output Internal Transformer Isolation	410.00
SDC/RDC1742	12	S, R	±8.5	18	400, 2.6 k	Yes	8	C, M	C I	Tristate, Latched Output Internal Transformer Isolation	431.00
AD2S81A ³	12	I, R	±30 ⁴	260	400→20 k	No	1	C	C I	Monolithic, User Selectable Dynamic Characteristics, High Tracking Rate, Quality Velocity Output, Class 2 ESD	70.00
SDC/RDC1740	14	S, R	±5.3	27	400, 2.6 k	Yes	8	C, M	C I	Tristate, Latched Output Internal Transformer Isolation	466.00
2S54	14	LVDT	±0.006 ⁵	360 LSB/ms ⁶	360→5 k	No	8	C, M	C I	Direct Ratiometric Conversion of LVDT Signal, Selectable Input Gain. No External Trims	351.00
2S56	16	LVDT	±0.006 ⁴	360 LSB/ms ⁶	360→5 k	No	8	C, M	C I	Direct Ratiometric Conversion of LVDT Signal, Selectable Input Gain. No External Trims	420.00
2S58	16	LVDT	±0.003 ⁵	680 LSB/ms ⁶	7 k→11 k	No	8	C, M	C I	Direct Ratiometric Conversion of LVDT Signal, High Gain, Ultra-Linear	931.00
AD2S80A ³	16, 14, 12, 10 ⁷	I, R	±2, ±4, ±8	1040 ⁸	50–20 k	No	1, 4	C, I, M	C I	Monolithic, User Selectable Dynamic Characteristics, and Resolution High Tracking Rate and Quality Velocity Output, Class 2 ESD	89.10
AD2S82A ³	16, 14, 12, 10 ⁵	I, R	±2, ±4, ±8	1040 ⁸	50–20 k	No	5	C	C I	Monolithic, User Selectable Dynamic Characteristics, and Resolution High Tracking Rate and Quality Velocity Output, Class 2 ESD	43.00
AD2S83	16, 14, 12, 10	R	±8	1040 ⁸	50–20 k	No	5	I	C I	Monolithic, User Selectable Dynamic Characteristics, and Resolution High Tracking Rate and ±0.15% Linearity Velocity Output	85.00
AD2S34	14	R	±2.6, ±4.0	20, 48	0.4, 2.6, 4.0 k	No	12	M	C I	Dual Channel Resolver-to-Digital Converter with On-Board Oscillator. No External Trims	456.00
AD2S46	16	S, R	±1.3, ±2.6	12	0.4→2.6 k	No	1	M	C I	16 Bit Resolver/Synchro-to-Digital Converter, 1.3 arc min in a 28-Pin DIP Ceramic Package. No External Trims	413.00

Model	Res Bits	Input Format ¹	Accuracy arc mins	Tracking Rate Options revs/sec ²	Reference Frequency Options Hz	Input Isol	Package Options	Temp Range	Page	Comments	Price Single Piece \$
AD2S44	14	S, R	± 2.6 , ⁹ ± 4.0 , ± 5.2	20	0.4—2.6 k	No	8	M	C I	Dual Channel Resolver/ Synchro-to-Digital Converter with Loss of Track Detection. No External Trims	418.00
AD2S90	12	R	± 8	750 ⁴	2.0—10.0 k	No	5	C, I	C I	Low Cost RDC, Incremental Encoder and Absolute Position Output	†
AD2S47	16, 14	S, R	± 1.3 , ± 2.6	5, 20	200, 400	No	8	M	C I	Second Source for NATEL HSRDC 1006/56, 75 mW Power Consumption, MIL-STD-883	†
AD2S93	14	LVDT	0.1, 0.05%	TBD	2.0–10.0 k	No	5	I	C I	14-Bit LVDT-to-Digital Converter	†

¹S = Synchro; R = Resolver; I = Inductosyn.

²In general, higher reference frequency options have higher tracking rates.

³Die Revision.

⁴Consult data sheet.

⁵LVDT converter accuracy given as % full-scale linearity.

⁶Slew Rate (min).

⁷Resolution is user selectable.

⁸Depends on resolution selected.

⁹ ± 2.6 arc min only available over 0°C to 70°C.

Boldface type: product recommended for new design.

*New product.

†Consult factory for price.

‡Inductosyn is a registered trademark of Farrand Industries, Inc.

Selection Guides

Sample/Track-Hold Amplifiers

Model	Specified Accuracy %	Acquisition Time μ s max	Aperture Time ns typ	Aperture Jitter ns typ	Droop Rate μ V/ μ s max	Package Options	Temp Range	Page	Comments	Price 100s \$
AD1154	0.00076	5.0	80	0.15	0.1	13	C, I	C II	Low Cost 16-Bit Accurate, High Speed Amplifier	42.00
AD386	0.00076	4.1	12	0.04	0.1	1	C, M	C II	High Resolution, High Speed Track-and-Hold Amplifier	79.00
AD389	0.003	2.5	30	0.4	0.1	1	C, I	C II	High Resolution Track-and-Hold Amplifier	74.00
AD9100	0.01	0.023	0.8	<0.001	6000	1, 14	C, I, M	C II	Ultrahigh Speed Monolithic T/H, Low Distortion	79.00
AD783	0.01	0.25	15	0.01	1	2, 3	C, I, M	C II	Complete 250 ns Sample-and-Hold Amplifier	†
AD781	0.01	0.7	25	0.05	1	2, 3	C, I, M	C II	Complete 700 ns Sample-and-Hold Amplifier	6.00
AD682	0.01	0.7	25	0.05	1	2, 3	C, I, M	C II	Two-Channel 700 ns Sample-and-Hold Amplifier	12.00
AD684	0.01	1.0	20	0.1	1	3	C, I, M	C II	Quad, Monolithic 1 μ s SHA	23.50
AD346	0.01	2.0	60	0.4	0.5	1	C, M	C II	High Speed Sample-and-Hold, Industry Standard	62.00
AD585	0.01	3.0	35	0.5	1	3, 4, 5	C, I, M	C II	High Speed, Precision, On-Board Hold Cap	9.90
SMP-10	0.01	3.5	50	1	0.02	3	C, M	C II	Low Droop Rate, High Sample/Hold Current Ratio	9.50
SMP-11	0.01	3.5	50	1	0.2	2, 3	C, I, M	C II	Low Droop Rate, Fast Hold Mode Settling Time	2.25
SMP-18	0.01	3.5	—	—	0.04	2, 3, 6	I	C II	Fast SMP-08	6.95
AD583	0.01	5.0	50	5	—	1	C	C II	5 μ s SHA	16.35
SMP-04	0.01	7.0	—	—	0.025	2, 3, 6	I, M	C II	CMOS, Quad Sample-and-Hold Amplifier, Low Cost	3.90
SMP-81	0.045	3.5	50	1	2.0	3	I	C II	High Accuracy, Fast Acquisition for PCM Encodes	5.50
AD582	0.1	6.0	200	15	—	1, 8	C, M	C II	Low Cost, 15 μ s	8.00
SMP-08	0.1	7.0	—	—	0.02	2, 3, 6	I, M	C II	Octal, Sample-and-Hold with Multiplexed Input	6.25
*AD9101	0.1	0.007	0.5	<0.001	9000	—	C, I, M	SF-91	100 MSPS Track-and-Hold Amplifier	†

Voltage References

Model	Output Voltage V	Initial Accuracy % FS max	Temp Stability $\mu\text{m}/^\circ\text{C}$ max	Package Options	Temp Range	Page	Comments	Price \$
AD589	+1.235	1.2–2.8	10–100	7	C, M	C II	Two Terminal, 1.2 V Reference	1.25
AD680	+2.5	0.2–0.4	20–30	2, 6, 16	C, I	C II	Low Cost, Low Power 2.5 V Reference	1.60
AD580	+2.5	0.4–3	10–85	7	C, M	C II	Precision, Three Terminal, 2.5 V Reference	2.25
AD1403/AD1403A	+2.5	0.4–1	25–40	2	I	C II	Second Source, 2.5 V Reference	1.65
REF-43	+2.5	0.6–1	10–25	2, 3, 6, 7	I, M	C II	Precision Bandgap Reference	3.75
REF-03	+2.5	0.6	50	2, 6	I	C II	Low Cost Bandgap Reference	1.75
AD586	+5	0.05–0.4	5–25	3, 6	C, M	C II	Precision, Buried Zener 5 V Reference	2.80
REF-02	+5	0.3–0.5	8.5–25	2, 3, 4, 6, 7	C, I, M	C II	Precision Bandgap Reference	1.65
REF-05	+5	0.3–0.6	8.5–25	7	M	C II	Guaranteed Long Term Stability	25.00
AD2710	+10	0.01	1–5	2	C	C II	Ultrahigh Precision 10 V Reference	29.60
AD2700	+10	0.025–0.05	3–10	1	C, M	C II	Very High Precision 10 V Reference	22.45
AD587	+10	0.05–0.1	5–20	3, 6	C, M	C II	Precision 10 V Buried Zener Reference	2.60
AD581	+10	0.05–0.3	5–30	7	C, M	C II	Three Terminal 10 V Bandgap Reference	3.45
REF-01	+10	0.3–0.5	8.5–25	2, 3, 4, 6, 7	C, I, M	C II	Precision Bandgap Reference	2.47
REF-10	+10	0.05–0.4	5–25	2, 3, 6, 7	I, M	C II	Precision Bandgap Reference	25.00
AD2712	± 10	0.01	1–5	2	C	C II	Ultrahigh Precision ± 10 V Reference	35.70
AD688	± 10	0.02–0.05	1.5–6	3	I, M	C II	High Precision Monolithic ± 10 V Reference	12.75
AD2702	± 10	0.025–0.05	3–10	1	C, M	C II	Very High Precision ± 10 V Reference	28.05
AD2701	–10	0.025–0.05	3–10	1	C, M	C II	Very High Precision –10 V Reference	28.05
REF-08	–10, –10.24	0.3–0.4	50–100	2, 3, 6	I, M	C II	General Purpose Buried Zener Reference, Pin Selectable Output	2.40
AD588	Selectable	0.01	1.5–6	2, 3, 4	C, I, M	C II	Ultrahigh Precision, Monolithic Programmable Reference	9.75
AD584	Selectable	0.05–0.3	5–30	4, 7	C, M	C II	Precision, Programmable Bandgap Reference	2.95

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

Selection Guides

Analog Switches & Multiplexers

CMOS Switches

Model	Function	Leakage Current nA max	R _{ON} Ohms max	Latched	Package Options	Temp Range	Page	Comments	Price 100s \$
ADG411	Quad SPST	0.25	35		2, 3, 6	I, M	C II	Second Source to DG411, Dielectrically Isolated	†
ADG412	Quad SPST	0.25	35		2, 3, 6	I, M	C II	Second Source to DG412, Dielectrically Isolated	†
ADG441	Quad SPST	0.25	80		2, 3, 6	I, M	C II	Second Source to DG441, Upgrade for DG201A/ADG201A, Dielectrically Isolated	†
ADG442	Quad SPST	0.25	80		2, 3, 6	I, M	C II	Second Source to DG442, Upgrade for DG202A/ADG201A, Dielectrically Isolated	†
ADG444	Quad SPST	0.5	80		2, 3, 6	I, M	C II	Superior Second Source to DG444, Dielectrically Isolated, Upgrade for ADG211A	†
ADG445	Quad SPST	0.5	80		2, 3, 6	I, M	C II	Superior Second Source to DG445, Dielectrically Isolated, Upgrade for ADG212A	†
ADG201HS	Quad SPST	1	50		2, 3, 4, 5, 6	C, I, M	C II	High Speed Quad Switch, 44 V Supply Maximum Ratings	3.10
ADG201A	Quad SPST	1-2	90		2, 3, 4, 5, 6	C, I, M	C II	44 V Supply Maximum Ratings	2.68
ADG202A	Quad SPST	1-2	90		2, 3, 4, 5, 6	C, I, M	C II	44 V Supply Maximum Ratings	2.68
ADG221	Quad SPST	1-2	90	X	2, 3, 4, 5, 6	C, I, M	C II	Latched Input, 44 V Supply Maximum Ratings	2.41
ADG222	Quad SPST	1-2	90	X	2, 3, 4, 5	C, I, M	C II	Latched Input, 44 V Supply Maximum Ratings	2.41
AD7510DI	Quad SPST	5-10	100		2, 3, 4, 5	C, M	C II	DiCMOS, Dielectrically Isolated	6.40
AD7511DI	Quad SPST	5-10	100		2, 3, 4, 5	C, M	C II	DiCMOS, Dielectrically Isolated	6.40
AD7590DI	Quad SPST	5	90	X	2, 3, 4, 5	C, I, M	C II	DiCMOS, Latched Input, Dielectrically Isolated	5.45
AD7591DI	Quad SPST	5	90	X	2, 3, 4, 5	C, I, M	C II	DiCMOS, Latched Input, Dielectrically Isolated	5.45
SSM-2404	Quad SPST	20	45		2, 6	I	C II, AV	"Clickless" Quad Audio Switch (CBCMOS)	3.45
ADG211A	Quad SPST	5	115		2, 5, 6	C	C II	Low Cost, 44 V Supply Maximum Ratings	1.60
ADG212A	Quad SPST	5	115		2, 5, 6	C	C II	Low Cost, 44 V Supply Maximum Ratings	1.60
AD7512DI	Dual SPDT	5-10	100		2, 3, 4, 5	C, M	C II	DiCMOS, Dielectrically Isolated	6.40
AD7592DI	Dual SPDT	5	90	X	2, 3, 4, 5	C, M	C II	DiCMOS, Latched Input, Dielectrically Isolated	5.45

Bipolar JFET Switches

Model	Function	Leakage Current nA max	R _{ON} Ohms max	Package Options	Temp Range	Page	Comments	Price 100s \$
SW-01	Quad SPST	1.0	100	3	I	C II	Improved DG201	8.50
SW-02	Quad SPST	1.0	100	3	I	C II	Improved DG202	8.50
SW-06	Quad SPST	2.0	80	2, 3, 4, 6	I, M	C II	Improved LF11333/13333, Configures to 2X SPDT & DPDT	1.91
SW-201	Quad SPST	10.0	150	2, 6	I	C II	Improved Low Cost DG201	2.70
SW-202	Quad SPST	10.0	150	2, 6	I	C II	Improved Low Cost DG202	2.90
SW-7510	Quad SPST	1.0	75	3, 4	I, M	C II	Improved HI-7510	7.50
SW-7511	Quad SPST	1.0	75	3, 4	I, M	C II	Improved HI-7511	8.40
SSM-2402	Dual SPST	10.0	85	2, 6	I	C II, AV	"Clickless" Bilateral Audio Switch	3.53
SSM-2412	Dual SPST	10.0	85	2, 6	I	C II, AV	Fast, Dual Audio Switch	3.53

CMOS Multiplexers

Model	Function	Leakage Current nA max	R _{ON} Ohms max	Latched	Package Options	Temp Range	Page	Comments	Price 100s \$
AD75019	16:16	10	300	Yes	5	C	C II	16 × 16 Analog Crosspoint, Serial Interface	15.00
ADG506A	16:1	1	280		2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG506A	6.95
ADG526A	16:1	1	280	X	2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG526A	7.75
AD7506	16:1	1-5	300		2, 3, 4	C, M	C II		11.50
ADG507A	Diff. 8:1	1	280		2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG507A	6.95
ADG527A	Diff. 8:1	1	280	X	2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG527A	7.75
AD7507	Diff. 8:1	1-5	300		2, 3, 4	C, M	C II		11.50
ADG408	8:1	0.5	100		2, 3, 6	C, I, M	C II	Superior Second Source to DG408	†
ADG508A	8:1	1	300		2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG508A	3.95
ADG528A	8:1	1	300	X	2, 3, 4, 5	C, I, M	C II	Superior Second Source to DG528A	4.54
AD7501	8:1	1-5	300		2, 3, 4	C, M	C II		6.25
AD7503	8:1	1-5	300		2, 3, 4	C, M	C II		6.25
ADG409	Diff. 4:1	0.5	100		2, 3, 6	C, I, M	C II	Superior Second Source to DG409	†
ADG509A	Diff. 4:1	1	300		2, 3, 4, 5, 6	C, I, M	C II	Superior Second Source to DG509A	3.95
ADG529A	Diff. 4:1	1	300	X	2, 3, 4, 5	C, I, M	C II	Superior Second Source to DG529A	4.54
AD7502	Diff. 4:1	1-5	300		2, 3, 4	C, M	C II		6.25

Bipolar JFET Multiplexers

Model	Function	Leakage Current nA max	R _{ON} Ohms max	Package Options	Temp Range	Page	Comments	Price 100s \$
MUX-08	8:1	1.0	300	2, 3, 4, 6	C, I, M	C II	Improved DG508	4.25
MUX-16	16:1	1.0	380	2, 3, 4, 5	I, M	C II	Improved DG506	5.40
MUX-24	Diff. 4:1	1.0	300	2, 3, 4, 6	C, I, M	C II	Improved DG509	4.70
MUX-28	Diff. 8:1	1.0	380	2, 3, 4, 5	I, M	C II	Improved DG507	9.90
MUX-88	8:1	100	400	3	I	C II	8-Channel Telecom Multiplexer	6.40

Video Multiplexer

Model	Function	Full Power BW MHz min	Crosstalk Rejection f = 10 MHz dB	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9300	4:1	30	75	3, 4	C, M	C II	Wideband Video Mux	8.00

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.



Selection Guides

Comparators

Model	Prop Delay ns max	Dispersion ps	Logic	V _{OS} mV max	Package Options	Temp Range	Page	Comments	Price 100s \$
AD1317	2.5	250	ECL	10	12	C	L	Dedicated Window Comparator with Wide CM Range	†
AD96685	3.5	50	ECL	2	3, 4, 5, 6, 7	I, M	L	Ultrafast	3.25
AD96687	3.5	50	ECL	2	3, 4, 5, 6	I, M	L	Dual AD96685	4.90
AD9696	7.0	100	TTL	2	2, 3, 6, 7, 12	C, M	L	Single Comparator	3.50
AD9698	7.0	100	TTL	2	3, 6, 7, 12	C, M	L	Dual Comparator	6.00
CMP-08	9.5	—	ECL	2.5	3	I, M	P	High Speed with ECL Outputs	3.35
AD790	45	—	TTL	0.25–1	2, 3, 6	C, I, M	L	Fast, Precise Single or Dual Supply	2.95
CMP-05	55	—	TTL	0.6	2, 3, 6, 7	I, M	P	High Speed Precision Comparator	2.00
PM-119/219	80	—	TTL	4.0	2, 3	I, M	P	High Speed, Single or Dual Supply	2.50
PM-111/211	180	—	TTL	3.0	1, 2, 4, 6, 7	I, M	P	Fast, Wide Input Range, General Purpose	1.50
CMP-01	180	—	TTL	0.8	2, 3, 7	C, M	P	Fast Precision Comparator	2.50
CMP-02	270	—	TTL	0.8	2, 3, 7	C, M	P	Low Input Current Precision Comparator	2.50
CMP-04	300 typ	—	TTL	1.0	2, 3, 6	I, M	P	Quad Low Power Precision Comparator	4.50
CMP-404	800	—	TTL	1.0	3	I, M	P	Quad Low Power Precision Comparator	2.00
PM-139	1300	—	TTL	2	1, 2, 4	I, M	P	Low Power, Single or Dual Supply	1.99

Matched Transistors

Model	Type	V _{OS} Max μV	TCV _{OS} Max μV/°C	hFE Min ¹	ΔhFE max %	en max nV/√Hz ²	Package Options	Temp Range	Page	Comments	Price 100s \$
MAT-01	Dual NPN	100	0.5	500	3	7.5	7	M	P	Low Cost	1.00
MAT-02	Dual NPN	50	0.1	500	2	1	4, 7	I, M	P	Low Noise, Low I _{BE}	1.10
MAT-03	Dual PNP	100	0.5	100	2	1	4, 7	I, M	P	Low Noise	2.25
MAT-04	Quad NPN	200	1	300	2	2.5	2, 3, 6	I, M	P	Low Cost	1.65
SSM-2210	Dual NPN	200	1	300	5	1	2, 6	I	P, AV	Low Cost, Audio	1.50
SSM-2220	Dual PNP	200	1	80	6	1	2, 6	I	P, AV	Low Cost, Audio	1.95

Operational Amplifiers

Low Noise Amplifiers

Model	Voltage Noise en typ 1 kHz nV $\sqrt{\text{Hz}}$	Voltage Noise en typ 10 kHz nV $\sqrt{\text{Hz}}$	Current Noise In \pm In- typ 1 kHz pA $\sqrt{\text{Hz}}$	I _B typ nA	V _{OS} typ mV	GBW MHz typ	SR V/ μ s typ	Settling Time ns to % typ	A _{CL} min V/V	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9610	1.6	0.7	32/32	5000	0.3	100	3500	1-0.1	1	2	I, M	L	Wide Bandwidth, Fast Settling	99.00
AD9617	2.0	1.3	32/32	12000	0.5	570	1400	10-0.1	± 1	2, 3, 6, 12	C, I, M	L	Low Distortion, Wide Bandwidth	8.75
AD9618	2.0	1.3	32/32	10000	0.5	8000	1800	9-0.1	+5, -1	2, 3, 6, 12	C, I, M	L	Low Distortion, Wide Bandwidth	8.75
AD829	1.7	—	1.5	3300	0.2	750	230	65-0.1	1	2, 3, 6	C, I, M	L	High Speed, Low Noise, Video Amp	2.95
AD844	2	—	12/10	200	0.05	900	2000	100-0.1	1	2, 3, 6	I, M	L	Current Feedback Amplifier	2.95
AD846	2	—	6/20	100	0.025	450	450	110-0.01	1	2, 3	I, M	L	Current Feedback, Precision	6.25
AD849	3	—	—	3300	0.3	725	300	80-0.1	25	2, 3, 6	C, I, M	L	High Speed, Low Power	2.95
OP-27	3.0	3.5	0.4	10	0.01	8	2.8	—	1	2, 3, 4, 6, 7	C, I, M	P	Low Noise, Precision	1.54
AD OP-27	3	3.5	0.4	10	0.01	8	2.8	—	1	2, 3, 7	I, M	L	Low Noise, Precision	1.54
OP-227	3	3.5	0.4	10	0.02	8	2.8	—	1	3	C, I, M	P	Dual Matched Precision	5.85
OP-37	3	3.5	0.4	10	0.01	63	17	—	1	2, 3, 4, 6, 7	C, I, M	P	Fast, Precision A _{VCL} ≥ 5	1.26
AD OP-37	3	3.5	0.4	10	0.01	63	17	—	5	2, 3, 7	I, M	L	Low Noise, Precision	1.26
*AD745	3.2	2.9	0.007	0.150	0.1	20	12.5	5000-0.01	5	2, 3, 6	C, I, M	SF-92	Ultralow Noise, High Speed, BiFET Op Amp	3.95
AD743	3.2	2.9	0.007	0.15	0.1	4.5	2.8	—	1	2, 3, 6	C, I, M	L	Ultralow Noise FET Input	3.95
OP-270	3.2	3.6	0.6	5	0.01	5	2.4	—	1	2, 3, 4, 6	I, M	P	Dual Monolithic	3.50
SSM-2139	3.2	3.2	0.6	5	0.02	30	11	—	3	2, 6	I	P, AV	Dual Audio	1.85
SSM-2134	3.5	3.5	0.6	350	0.3	10	13	—	3	2	I	P, AV	Improved Replacement for "5534A"	1.25
OP-470	3.2	3.8	0.4	6	0.1	6	2	—	1	2, 3, 4, 6	I, M	P	Quad Monolithic, Low Noise	5.50
AD5539	4	—	—	6000	2	1400	600	12-1	5	2, 3	C, M	L	Improved Replacement for SE/NE5539	1.70
AD840	4	—	—	3500	0.1	400	400	100-0.01	10	2, 3, 4	C, M	L	Wide Bandwidth, Precision	3.95
OP-50	4.5	5.5	0.23	1	0.01	25	3	—	5	3	I, M	P	High Output Current	6.00
*OP-275	6	5	—	100	1	8	25	—	1	2, 6	I, M	SF-92	Dual Audio Amp	†
AD848	5	—	—	3300	0.2	175	300	100-0.1	5	2, 3, 6	C, I, M	L	High Speed, Low Power	2.95
OP-471	6.5	9	0.4	7	0.25	6.5	8	—	1	2, 3, 4, 6	I, M	P	Quad Monolithic, Fast	6.05
OP-271	7.6	16	0.6	4	0.075	5	8.5	—	1	2, 3, 4, 6	I, M	P	Dual Monolithic, Fast	3.50
OP-61	3.4	16	1.7	130	0.1-0.2	200	45	300-0.01	10	2, 3, 4, 6	I, M	P	Wide Bandwidth	4.21
AD645	9	8	0.0006	0.0007	0.1	2	2	—	1	2, 7	C, I, M	L	FET Input, Low I _B	2.95

¹I_C = 1 mA

²f_C \geq 100 Hz

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.



Selection Guides

Operational Amplifiers

High Speed Amplifiers

Model	SR V/ μ s typ	GBW MHz typ	Settling Time ns to % typ	A _{CL} min V/V	V _{OS} mV typ	I _{OUT} mA min	Supply Current mA typ	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9610	3500	100	18–0.1	1	0.3	50	21	7	I, M	L	Wide Bandwidth, Fast Settling	99.00
*AD811	2500	1000	65–0.01	1	0.5	100 typ	16.5	2, 3, 4, 6	I, M	SF–92	High Speed Video Amp, 0.120/0.01° Differential Gain/Phase Error, 0.1 dB Flatness at 35 MHz	3.35
AD844	2000	900	100–0.1	1	0.05	20	6.5	2, 3, 6	I, M	L	Constant 10 ns Rise Time for Any Pulse Input, Current Feedback	2.95
AD9618	1800	8000	10–0.1	–1	0.2	60	31	2, 3, 6, 12	C, I, M	L	Low Distortion, Wideband, IMD \leq –70 dBc at 20 MHz	8.75
AD9617	1600	570	10–0.1	1	0.4	60	34	2, 3, 6, 12	C, I, M	L	Low Distortion, Wide Bandwidth, IMD \leq –70 dBc at 20 MHz	8.75
OP-160	1300	90	75–0.1	1	2	35	6.5	2, 3, 6	I, M	P	High Speed, Current Feedback	4.50
OP-260	1000	90	250–0.1	1	1	20	9	2, 3, 4, 6, 7	I, M	P	Dual Current Feedback	7.95
AD5539	600	1400	12–1	5	2	15	14	2, 3	C, M	L	Improved Replacement for SE/NE5539	1.70
AD846	450	450	110–0.01	1	0.025	20 typ	5	2, 3	I, M	L	High Speed, Precision, Current Feedback	6.25
AD840	400	400	100–0.01	10	0.1	50	10.5	2, 3, 4	C, M	L	Wide Bandwidth Precision, Fast Settling, A _{VCL} \geq 10	3.95
AD842	375	80	100–0.01	2	0.3	100	13	2, 3, 4, 7	C, M	L	Fast Settling, High Current Output, Cable Driver, A _{VCL} \geq 2	4.25
AD849	300	725	80–0.1	25	0.3	20 typ	5.1	2, 3, 6	C, I, M	L	High Speed, Low Power Preamp, Drives Capacitive Loads	2.95
AD848	300	175	100–0.1	5	0.2	20 typ	5.1	2, 3, 6	C, I, M	L	High Speed, Low Power, Drives Capacitive Loads	2.95
AD827	300	50	120–0.1	1	0.5	20 typ	10.5	2, 3, 6	C, I, M	L	Dual AD847	5.31
AD847	300	50	120–0.01	1	0.5	20 typ	5.3	2, 3, 6	C, I, M	L	High Speed, Low Power, Drives Capacitive Loads	2.95
AD841	300	40 ¹	110–0.01	1	0.5	50	11	2, 3, 4, 7	C, M	L	High Speed, Precision, Drives Capacitive Loads	3.95
AD843	250	34 ¹	135–0.01	1	0.5	50	12	2, 3, 4, 6, 7	C, I, M	L	FET Input, Fast Settling, High Speed	4.35
AD829	230	750	65–0.1	1	0.2	20 typ	5.3	2, 3, 6	C, I, M	L	High Speed, Low Noise, Video Amp	2.95
*OP-467	170	30	150	1	0.5	10	8	2, 3, 5, 6	I, M	SF–93	Quad High Speed	†
OP-64	170	80	100–0.1	5	0.4–1.2	50	6.2	2, 3, 4, 6, 7	I, M	P	Wide Bandwidth, High Output Current	5.50
OP-44	120	23	200–0.1	3	0.3–1.5	20	6.5	3, 7	I, M	P	High Speed, Precision	3.00
AD845	100	16 ¹	350–0.01	1	0.1	25 typ	10	2, 3, 6	C, I, M	L	FET Input, Fast Settling, High Speed	3.25
AD744	75	13	500–0.01	2	0.1	—	3.5	2, 3, 6, 7	C, I, M	L	FET Input, Fast Settling, High Speed, Custom Compensation	2.25
AD746	75	13	500–0.01	2	0.25	—	7	2, 3, 6	C, I, M	L	Dual AD744	4.25
OP-17	60	30	600–0.1	1	0.2–0.5	5.5	4.6	2, 3, 6, 7	C, I, M	P	Precision, Low Power	2.00
OP-42	58	10	800–0.01	1	0.3–1.5	20	5.1	2, 3, 4, 6, 7	I, M	P	Precision, Fast Settling	1.60
SSM-2131	50	10	900–0.01	1	1.5	20	5.1	2, 6	I	P, AV	Ultralow Distortion, Low Cost	1.95



Model	SR V/ μ s typ	GBW MHz typ	Settling Time ns to % typ	A _{CL} min V/V	V _{OS} mV typ	I _{OUT} mA min	Supply Current mA typ	Package Options	Temp Range	Page	Comments	Price 100s \$
OP-61	45	200	300–0.01	10	0.1–0.2	22	6.1	2, 3, 4, 6	I, M	P	Wide Bandwidth, Ultralow Noise	4.21
PM-157A	45	20	4000–0.01	1	1	5	5	3, 7	C, M	P	Improved Industry Standard	2.79
OP-16	25	8	900–0.1	1	0.2–0.5	5.5	4.6	2, 3, 6, 7	C, I, M	P	Precision, Low Power	1.71
OP-249	22	4.7	900–0.01	1	0.2–0.4	20	5.6	2, 3, 4, 6, 7	I, M	P	Dual Precision, Low Power, Low Distortion	1.25
AD711	20	4	1000–0.01	1	0.3	25 typ	2.5	2, 3, 6, 7	C, I, M	L	Precision BiFET	0.80
AD712	20	4	1000–0.01	1	0.3	25 typ	5	2, 3, 6, 7	C, I, M	L	Dual AD711	1.25
AD713	20	4	1000–0.01	1	0.3	25 typ	10	2, 3, 6	C, I, M	L	Quad AD711	3.50
OP-215	18	5.7	900–0.1	1	0.2–2	5.5	6	2, 3, 4, 6, 7	C, I, M	P	Dual Precision	2.50
OP-01	18	2.5	700–0.1	1	0.3–2	6	1.6	2, 3, 7	C, M	P	Inverting, High Speed	1.00
OP-15	13	6	1200–0.1	1	0.2–0.5	5.5	2.7	2, 3, 6, 7	C, I, M	P	Precision, Low Power	1.71
*AD745	12.5	2.0	5000–0.01	5	0.1–0.25	20	8	2, 3, 6	C, I, M	SF-92	Ultralow Noise, High Speed, BiFET Op Amp	3.95
PM-156A	12	4.5	4000–0.01	1	1	5	5	3, 4, 7	C, M	P	Improved Industry Standard	2.79
SSM-2139	11	30	—	3	0.02	20	4	2, 6	I	P, AV	Dual, Low Noise	1.85
*OP-282	9.0	4	1500–0.01	1	1	10	0.5	2, 3, 6	I	SF-93	Dual High Speed, Low Power	†
*OP-482	9.0	4	1500–0.01	1	2	10	1.0	2, 3, 5, 6	I	SF-93	Quad High Speed, Low Power	†

Single Supply Amplifiers

Model	ISY max mA	V _{OS} max mV	Supply Voltage Range V	GBW typ MHz	SR typ V/ μ s	Package Options	Temp Range	Page	Comments	Price 100s \$
OP-22	0.0002–0.4	0.3–1	+3 to +30	0.25	0.08	2, 3, 6, 7	I, M	P	Programmable	1.45
OP-32	0.0005–2	0.3–1	+3 to +30	4.5	1.5	2, 3	I, M	P	Fast, Programmable A _{VCL} = 10	1.60
OP-90	0.02	0.15–0.45	+1.6 to +36	0.02	—	2, 3, 4, 6	I, M	P	Micropower, Low Voltage	1.65
OP-290	0.04	0.2–0.5	+1.6 to +36	0.02	—	2, 3, 4, 6	I, M	P	Dual Micropower, Low Voltage	2.50
OP-20	0.08	0.25–1	+5 to +30	0.1	0.05	2, 3, 4, 6	I, M	P	Micropower, Low Cost	1.50
OP-490	0.08	0.5–1	+1.6 to +36	0.02	—	2, 3, 4, 6	I, M	P	Quad Micropower, Low Voltage	3.30
OP-220	0.17	0.15–0.75	+5 to +30	0.2	0.05	2, 3, 6, 7	I, M	P	Dual Micropower, Low Cost	2.13
*OP-295	0.200	0.25–1.0	+3 to +36	0.08	0.02	2, 3, 6	I, M	SF-93	Rail to Rail Dual	†
OP-80	0.325	1.5	+5 to +16	0.3	0.4	2, 6, 7	I, M	P	Low I _B , CMOS	1.95
OP-420	0.36	2.5–6	+5 to +30	0.15	0.05	2, 3, 4, 6	I, M	P	Quad Micropower, Low Cost	1.80
OP-21	0.3–0.4	0.1–0.5	+5 to +30	0.6	0.25	2, 3, 6, 7	I, M	P	Low Cost, Low Power	1.50
OP-221	0.8	0.15–0.5	+5 to +30	0.6	0.3	2, 3, 6, 7	I, M	P	Dual Low Cost, Low Power	2.13
OP-421	1.8	2.5–6	+5 to +30	1.9	0.5	2, 3, 6	I, M	P	Quad Low Cost, Low Power	1.80

¹–3 dB BW

Boldface Type: Product recommended or new design.

*New product.

†Consult factory for price.



Selection Guides

Operational Amplifiers

Precision Amplifiers

Model	V _{OS} μV max	V _{OS} TC μV/°C max	Noise μV p-p 0.1–10 Hz typ	GBW MHz typ	Slew Rate V/μs typ	I _B nA max	CMRR dB f = 1 kHz typ	Package Options	Temp Range	Page	Comments	Price 100s \$
OP-177	10–60	0.1–1.2	0.35	0.6	0.3	1.5–2.8	110	2, 3, 6	I, M	P	Highest Precision	1.00
AD707	15–90	0.1–1.0	0.23	0.9	0.3	1.0–2.5	100	2, 3, 6, 7	C, I, M	L	High Precision	1.25
OP-77	25–100	0.3–1.2	0.35	0.6	0.3	2–2.8	105	2, 3, 4, 6, 7	C, I, M	P	Next Generation OP-07	1.25
OP-50	25–100	0.3–1	0.12	25	3	5–10	85	3	I, M	P	Low Noise, High Output Current A _{VCL} ≥ 5	3.75
AD708	30–100	0.3–1.0	0.23	0.9	0.3	1.0–2.5	100	2, 3, 7	C, I, M	L	Dual AD707	2.95
AD705	25–90	0.6–1.2	0.5	0.8	0.15	0.1–0.15	110	2, 3, 6	C, I, M	L	Low I _B Precision Bipolar	1.05
OP-97	25–75	0.6–2	0.5	0.9	0.2	0.1–0.15	100	2, 3, 4, 6, 7	I, M	P	Low Power OP-07	1.60
OP-27	25–100	0.6–1.8	0.08	8	2.8	40–80	125	2, 3, 4, 6, 7	C, I, M	P	Low Noise, Precision	1.54
AD OP-27	25–100	0.6–1.8	0.08	8	2.8	40–80	123	2, 3, 7	C, I, M	L	Ultralow Noise	1.54
OP-37	25–100	0.6–1.8	0.08	63	17	40–80	125	2, 3, 4, 6, 7	C, I, M	P	Fast, Low Noise, Precision A _{VCL} ≥ 5	1.26
AD OP-37	25–100	0.6–1.8	0.08	63 (GBP)	17	40–80	123	2, 3, 7	I, M	L	Combines Precision and Speed	1.26
AD OP-07	25–150	0.6–2.5	0.35	0.6	0.17	2–12	95	2, 3, 6, 7	I, M	L	Improved Industry Standard	1.00
OP-07	25–150	0.6–2.5	0.35	0.6	0.3	2–12	98	2, 3, 4, 6, 7	C, I, M	P	Low Offset Voltage	1.15
AD846	25–200	0.8–5.0	—	75–450	450	250	—	2, 3	I, M	L	High Precision, High Speed	6.25
PM-1012	35–50	1.5	0.5	0.5	0.2	0.1–0.15	100	2, 3, 6, 7	C, I, M	P	Low Power, Low I _B	2.75
AD706	50–100	0.5–1.0	0.5	0.8	0.15	0.11–0.20	110	2, 3, 6	C, I	L	Dual AD705	2.36
AD704	75–150	1.0–1.5	0.5	0.8	0.1	0.15–0.27	110	2, 3, 6	C, I, M	L	Quad AD705	4.75
AD517	50–100	1.3–3	2	0.25	0.1	0.25–2	94	7	C, M	L		3.90
OP-297	50–200	0.6–2	0.3	0.5	0.15	0.1–0.2	105	2, 3, 6	I, M	P	Dual Precision, Low Power, Low I _B	2.65
*OP-497	50–150	0.5–1.5	0.3	0.5	0.15	0.1–0.2	130	2, 3, 4, 6	I, M	SF-94	Quad Precision, Low I _B	†
AD844	150–300	5	—	900	2000	250	—	2, 3, 6	I, M	L	Precision, High Speed	2.95
OP-200	75–200	0.5–2	0.5	0.5	0.15	2–5	110	2, 3, 4, 6	I, M	P	Dual Monolithic, Precision	2.75
OP-270	75–250	1–3	0.08	5	2.4	20–60	115	2, 3, 4, 6	I, M	P	Dual Monolithic, Low Power	3.50
OP-227	80–180	1–1.8	0.08	8	2.8	40–80	125	3	I, M	P	Dual Matched, Low Noise	5.85
OP-207	100–200	1.3–1.8	0.35	0.6	0.2	3–7	98	3	C, M	P	Dual Matched, Precision	8.40
OP-21	100–500	1–5	—	0.6	0.25	100–150	60	2, 3, 6, 7	I, M	P	Low Power, Single Supply	1.50
PM-1008	120	1.5	0.5	0.5	0.2	0.1	100	2, 3, 7	C, M	P	Low I _B , Low Power	3.25
OP-400	150–300	1.2–2.5	0.5	0.5	0.15	3–7	110	2, 3, 4, 6	C, I, M	P	Quad, Monolithic, Precision	3.35
OP-90	150–450	2–5	3	—	—	15–25	80	2, 3, 4, 6	I, M	P	Micropower, Low Voltage, Single Supply	1.65
OP-221	150–500	1.5–3	—	0.6	0.3	80–120	60	2, 3, 6, 7	C, I, M	P	Dual Low Power, Single Supply	2.00
OP-220	150–750	1.5–3	—	0.2	0.05	20–30	30	2, 3, 6, 7	C, I, M	P	Dual Micropower, Single Supply	2.13
OP-271	200–400	2–5	—	5	8.5	20–60	125	2, 3, 4, 6	I, M	P	Dual, Fast, Low Noise	3.50
OP-290	200–500	3–5	3	0.02	—	15–25	100	2, 3, 4, 6	I, M	P	Dual Micropower, Low Voltage Single Supply	2.50

Model	V _{OS} μV max	V _{OS} TC μV/°C max	Noise μV p-p 0.1–10 Hz typ	GBW MHz typ	Slew Rate V/μs typ	I _B nA max	CMRR dB f = 1 kHz typ	Package Options	Temp Range	Page	Comments	Price 100s \$
AD547	250–1000	1–5	2	1	3	0.025–0.05	60	7	C, M	L	Low Drift BiFET	2.95
AD647	250–1000	2.5–10	4	1	3	0.035	60	4, 7	C, M	L	Dual AD547	5.80
OP-20	250–1000	1.5–7	—	0.1	0.05	25–40	30	2, 3, 6, 7	C, I, M	P	Micropower, Single Supply	1.50
OP-43	250–1500	5–10	—	2.4	6	0.005–0.02	100	2, 7	C, I, M	P	Low I _B , Fast	2.50
AD548	250–2000	2–20	2	1	1.8	0.01–0.02	83	2, 3, 6, 7	C, I, M	L	Low Power BiFET	0.75
AD648	300–2000	3–20	2	1	1.8	0.01–0.02	83	2, 3, 6, 7	C, I, M	L	Dual AD548	1.25
OP-41	250–2000	5–10	—	0.5	1.3	0.005–0.02	100	2, 6, 7	C, I, M	P	Low I _B	2.50
OP-22	300–1000	1.5–3	—	0.25	0.08	5–10	60	2, 3, 6, 7	C, I, M	P	Micropower, Programmable	1.25
OP-32	300–1000	1.5–3	—	4.5	1.5	5–10	90	2, 3	C, I, M	P	Micropower, Fast, Programmable	1.00
OP-470	400–1000	2–4	0.08	6	2	25–60	110	2, 3, 4, 6	C, I, M	P	Quad, Low Noise	5.50
OP-471	800–1800	4–7	0.25	6.5	8	25–60	108	2, 3, 4, 6	C, I, M	P	Quad, Fast, Low Noise	5.50

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

Selection Guides

Operational Amplifiers

Low Cost, General Purpose Amplifiers

Model	V _{OS} mV max	V _{OS} TC μV/°C max	I _B nA max	BW MHz typ ¹	SR V/μs typ	Settling Time μs 0.01% typ	Noise μV p-p 0.1–10 Hz typ	Package Options	Temp Range	Page	Comments	Price 100s \$
OP-177	0.01–0.06	0.1–1.2	1.5–2.8	0.6	0.3	—	0.35	2, 3, 6	I, M	P	Highest Precision Performance	1.00
AD707	0.015–0.09	0.1–1	1–2.5	0.9	0.3	—	0.23	2, 3, 6, 7	C, I, M	L	Very High DC Precision	1.25
AD705	0.025–0.09	0.6–1.2	0.1–0.15	0.8	0.15	—	0.5	2, 3, 6	C, I, M	L	Low I _B Precision Bipolar	1.05
AD704	0.075–0.10	1.0–1.5	0.15–0.27	0.8	0.1	8	0.5	2, 3, 6	C, I, M	L	Quad AD705	4.75
AD706	0.05–0.10	0.5–1.0	0.15–0.25	0.8	0.1	8	0.5	2, 3, 6	C, I	L	Dual AD705	2.36
*OP-497	0.05–0.15	.5–1.5	0.1–0.2	0.5	0.15	—	0.3	2, 3, 4, 6	I, M	SF-94	Quad OP-97	†
OP-77	0.025–0.1	0.3–1.2	2–2.8	0.6	0.3	—	0.35	2, 3, 4, 6, 7	C, I, M	P	Next Generation OP-07	1.25
AD OP-07	0.025–0.15	0.6–2.5	2–12	0.6	0.17	—	0.35–0.38	2, 3, 6, 7	I, M	L	Improved Industry Standard	1.00
OP-07	0.025–0.15	0.6–2.5	2–12	0.6	0.3	—	0.35	2, 3, 4, 6, 7	C, I, M	P	Industry Standard Precision	1.00
OP-97	0.025–0.2	0.6–2	0.1–0.15	0.9	0.2	—	0.5	2, 3, 4, 6, 7	I, M	P	Low Power, Low I _B OP-07	1.60
PM-1012	0.035–0.05	1.5	0.1–0.15	0.5	0.2	—	0.5	2, 3, 6, 7	I, M	P	Low Power, Low I _B	3.25
AD711	0.025–2	3–20	0.025–0.05	4	20	1	2	2, 3, 6, 7	C, I, M	L	Excellent Combination of AC and DC Performance at Very Competitive Prices	0.80
PM-1008	0.12	1.5	0.1	0.5	0.2	—	0.5	2, 3, 7	C, M	P	Low Power Precision	3.25
OP-05	0.15–1.3	0.9–2	2–3	0.6	0.3	—	0.35	2, 3, 7	C, M	P	Instrumentation Operational Amplifier	2.10
*OP-285	0.25	—	150	8	20	—	1.1	2, 3, 6	I, M	SF-94	High Performance, Low Power	†
AD548	0.25–2	2–20	0.01–0.02	1	1.8	8	2	2, 3, 6, 7	C, I, M	L	Low Power, High Performance	0.75
AD542	0.5–2	5–20	0.025–0.05	1	3	—	2	7	C, M	L	High Performance BiFET	2.95
AD544	0.5–2	5–20	0.025–0.05	2	13	—	2	7	C, M	L	High Performance BiFET	3.10
OP-02	0.5–5	8–10	30–100	1.3	0.5	—	0.65	2, 3, 7	C, M	P	Improved “741”	1.90
OP-11	0.5–5	10–15	300–500	3	1	—	0.7	2, 3, 4, 6	C, I, M	P	Improved Quad “741”	1.60
OP-09	0.5–5	10–15	300–500	3	1	—	0.7	3	C, M	P	Improved “4136,” Quad	1.60
OP-01	0.7–5	8–20	30–100	2.5	18	—	—	2, 3, 7	C, M	P	Inverting, High Speed	1.00
OP-04	0.75–5	8–20	50–100	1.3	0.5	—	0.65	3, 7	I, M	P	Improved “747”	2.95
OP-14	0.75–5	8–20	50–100	1.3	0.5	—	0.65	2, 3, 6, 7	I, M	P	Improved “1458,” Dual	2.50
*OP-282	1.5	10	0.1	4	9	—	1.3	2, 3, 6	I	SF-93	Dual, High Speed, Low Power	†
*OP-482	2.5	10	0.1	4	9	—	1.3	2, 3, 5, 6	I	SF-93	Quad, High Speed, Low Power	†
AD741	3–6	20	200–500	1	0.5	—	—	2, 7	C, I, M	L	Improved Second Source	0.80

Low Power/Micropower Amplifiers

Model	ISY max mA	V _{OS} max mV	I _B max nA	GBW typ MHz	SR typ V/μs	Package Option	Temp Range	Page	Comments	Price 100s \$
OP-22	0.0002–0.4	0.3–1	5–10	0.25	0.08	2, 3, 6, 7	I, M	P	Programmable, Single Supply	1.25
OP-32	0.0005–2	0.3–1	5–10	4.5	1.5	2, 3	I, M	P	Fast, Programmable A _{VCL} ≥ 10, Single Supply	1.00
OP-90	0.02	0.15–0.45	15–25	0.02	—	2, 3, 4, 6	I, M	P	Micropower, Low Voltage Single Supply	1.65
OP-290	0.04	0.2–0.5	15–25	0.02	—	2, 3, 4, 6	I, M	P	Dual, Micropower, Low Voltage, Single Supply	2.50
OP-20	0.08	0.25–1	25–40	0.1	0.05	2, 3, 4, 6	I, M	P	Micropower, Single Supply, Low Cost	1.50
OP-490	0.08	0.5–1	15–25	0.02	—	2, 3, 4, 6	I, M	P	Quad, Micropower, Low Voltage, Single Supply	3.30
OP-220	0.17	0.15–0.75	20–30	0.2	0.05	2, 3, 6, 7	I, M	P	Dual, Low Cost, Micropower, Single Supply	2.13
AD548	0.2	0.25–0.2	0.01–0.02	1.0	1.8	2, 3, 7	C, I, M	L	Precision Low Power BiFET Op Amp	0.75
OP-80	0.325	1.5	0.00025–0.001	0.3	0.4	2, 6, 7	I, M	P	Low I _B , CMOS	1.75
OP-420	0.36	2.5–6	20–40	0.15	0.05	2, 3, 4, 6	I, M	P	Quad, Low Cost, Micropower, Single Supply	1.80
OP-21	0.3–0.4	0.1–0.5	100–150	0.6	0.25	2, 3, 6, 7	I, M	P	Low Cost, Low Power, Single Supply	1.50
*OP-282	0.5	2.0	0.1	4	9	2, 3, 6	I	SF-93	Dual, High Speed, Low Power	†
AD648	0.4	0.4–2.0	0.005–.01	1.0	1.8	2, 3, 7	C, I, M	L	Dual, Precision Low Power BiFET Op Amp	1.25
PM-1008	0.6	0.12	0.1	3.5	0.2	2, 3, 6, 7	C, M	P	Low Power	3.25
OP-97	0.6	0.025–0.075	0.1–0.15	0.9	0.2	2, 3, 4, 6, 7	I, M	P	Precision, Low I _B	1.60
AD705	0.6	0.025–0.09	0.1–0.15	0.8	0.15	2, 3, 6	C, I, M	L	Picoampere Input Current Bipolar Op Amp	1.05
PM-1012	0.6	0.035–0.05	0.1–0.15	0.5	0.2	2, 3, 6, 7	C, I, M	P	Precision, Low I _B	3.25
OP-221	0.8	0.15–0.5	80–120	0.6	0.3	2, 3, 6, 7	I, M	P	Dual, Low Cost, Low Power, Single Supply	2.00
OP-41	1	0.25–2	0.005–0.02	0.5	1.3	2, 6, 7	I, M	P	Low Power, Low I _B	2.50
*OP-482	1.0	3.0	0.1	4	9	2, 3, 5, 6	I	SF-93	Quad, High Speed, Low Power	†
OP-43	1–1.2	0.25–1.5	0.005–0.025	2.4	6	2, 7	I, M	P	Fast, Low Power, Low I _B	2.50
AD706	1.2	0.05–0.1	0.11–0.2	0.8	0.15	2, 3, 6	C, I, M	L	Dual, Picoampere Input Current Bipolar Op Amp	2.36
*OP-297	1.25	0.05–0.2	0.1–0.2	0.5	0.15	2, 3, 4, 6	I, M	SF-94	Dual, Precision, Low I _B	2.65
OP-200	1.45	0.075–0.2	2–5	0.5	0.15	2, 3, 4, 6	I, M	P	Dual, Precision	2.75
OP-421	1.8	2.5–6	50–150	1.9	0.5	2, 3, 6	I, M	P	Quad, Low Cost, Low Power, Single Supply	1.60
AD704	2.4	0.075–0.150	0.15–0.17	1.0	0.15	2, 3, 6	C, I, M	D	Quad, Picoampere Input Current Bipolar Op Amp	4.75
OP-400	2.9	0.15–0.3	3–7	0.5	0.15	2, 3, 4, 6	C, I, M	P	Quad, Precision	3.35

¹Unity gain small signal bandwidth.

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

Selection Guides

Operational Amplifiers

Low Input Current Amplifiers

Model	I_B pA max	Input Impedance		CMRR dB f=1 kHz typ	V_{OS} mV max	V_{OS} TC $\mu V/^{\circ}C$ max	BW MHz typ ¹	Package Options	Temp Range	Page	Comments	Price 100s \$
		Differential ΩpF typ	Common Mode ΩpF typ									
AD549	0.06–0.25	$10^{13} 1$	$10^{15} 0.8$	62	0.25–1	5–20	1	7	C, M	L	Monolithic, Lowest I_B	8.95
AD515A	0.075–0.3	$10^{14} 1.6$	$10^{15} 0.8$	62	1–3	15–50	1	7	C	L	Lower Cost AD515 Replacement	10.25
OP-80	0.25–1	—	—	90	1.5	—	0.3	2, 6, 7	I, M	P	Low Cost CMOS	1.75
AD546	0.5–1	$10^{13} 1$	$10^{15} 0.8$	62	1–2	20	1	2	C	L	Precision Low Cost Electrometer	3.75
AD645	1.5–3	$10^{13} 1$	$10^{14} 3$	94	0.25–0.5	1–5	2	2, 7	C, I, M	L	Low Noise, Precision BiFET	2.95
AD545A	1–2	$10^{13} 1.6$	$10^{15} 0.8$	62	0.25–1	3–25	1	7	C	L	Lower Cost AD545 Replacement	8.75
OP-41	5–20	—	—	98	0.25–2	5–10	0.5	2, 6, 7	C, I, M	P	High Stability JFET	2.50
AD548	10–20	$10^{12} 3$	$3 \times 10^{12} 3$	84	0.25–2	2–20	1	2, 3, 6, 7	C, I, M	L	Low Power, Low Cost	0.75
OP-43	5–25	—	—	98	0.25–1.5	5–10	2.4	2, 7	I, M	P	Low I_B , Fast $A_{VCL} \geq 3$	2.50
AD547	25–50	$10^{12} 6$	$10^{12} 3$	60	0.25–1	1–5	1	7	C, M	L	Low Drift	2.95
AD711	25–50	$3 \times 10^{12} 5.5$	$3 \times 10^{12} 5.5$	62	0.25–2	3–20	4	2, 3, 6, 7	C, I, M	L	Low Cost BiFET, Excellent AC and DC Performance	0.80
PM-155A	50	—	—	90	2	5	2.5	3, 7	C, M	P	Improved Industry Standard	2.79
PM-156A	50	—	—	90	2	5	4.5	3, 7	C, M	P	Improved Industry Standard	2.74
PM-157A	50	—	—	90	2	5	20	3, 7	C, M	P	Improved Industry Standard	2.79
OP-15	50–200	—	—	90	0.5–3	5–15	6	2, 3, 6, 7	C, I, M	P	Precision BiFET	1.71
OP-16	50–200	—	—	90	0.5–3	5–15	8	2, 3, 6, 7	C, I, M	P	Precision BiFET	1.71
OP-17	50–200	—	—	90	0.5–3	5–15	30	2, 3, 6, 7	C, I, M	P	Fast, Precision BiFET	2.00

Quad Operational Amplifiers

Model	V_{OS} mV max	V_{OS} TC $\mu V/^{\circ}C$ max	I_B nA max	BW MHz typ ¹	Slew Rate V/ μs typ	Settling Time 0.01% to 0.01% μs typ	Package Options	Temp Ranges	Page	Comments	Price 100s \$
AD704	0.075–0.10	1.0–1.5	150–270	0.8	0.10	—	2, 3, 6	C, I, M	L	Quad AD705, Low I_B Precision Bipolar	4.75
*OP-497	0.05–0.15	0.5–1.5	150–200	0.5	0.15	—	2, 3, 4, 6	I, M	SF-94	Low Power, Low I_B Precision Bipolar	†
OP-400	0.15–0.3	1.2–2.5	3–7	0.5	0.15	—	2, 3, 4, 6	C, I, M	P	Quad Monolithic, Precision	3.35
OP-470	0.4–1	2–4	25–60	6	2	—	2, 3, 4, 6	C, I, M	P	Quad Monolithic, Low Noise	5.50
*OP-467	0.5	—	100	30	170	150	2, 3, 5, 6	—	SF-93	30 MHz, Low Power	†
OP-490	0.5–1	5	15–25	0.02	—	—	2, 3, 4, 6	I, M	P	Micropower, Low Voltage, Single Supply	3.30
AD713	0.5–1.5	15	35–100	4	20	1	2, 3, 6	C, I, M	L	Superior AC and DC Performance, Quad AD711	3.50
OP-11	0.5–5	10–15	300–500	3	1	—	2, 3, 4, 6	C, I, M	P	Improved Quad “741”	1.60
OP-471	0.8–1.8	4–7	25–60	6.5	8	—	2, 3, 4, 6	C, I, M	P	Monolithic, Fast, Low Noise	5.50
*OP-482	3.0	10	0.1	4.0	9	1.5	2, 3, 5, 6	I	SF-93	High Speed, Low Power	†
PM-148/248	2.5	—	75	0.8	0.4	—	3	I, M	P	Improved Industry Standard	1.50
OP-421	2.5–6	10–15	50–150	1.9	0.5	—	2, 3, 6	I, M	P	Low Power, Low Cost, Single Supply	1.60
OP-420	2.5–6	10–25	20–40	0.15	0.05	—	2, 3, 4, 6	I, M	P	Micropower, Low Cost, Single Supply	1.80

Dual Operational Amplifiers

Model	V _{OS} mV max	V _{OS} TC μV/°C max	I _B nA max	BW MHz typ ¹	Slew Rate V/μs typ	Settling Time to 0.01% μs typ	Package Options	Temp Range	Page	Comments	Price 100s \$
AD708	0.03–0.1	0.3–1.0	1–2.5	0.9	0.3	—	2, 3, 7	C, I, M	L	Highest DC Precision; Excellent Matching Between Amps, Dual AD707	2.95
AD706	0.05–0.10	0.6–1.5	0.11–0.200	0.8	0.15	—	2, 3, 6	C, I	L	Dual AD705, Low I _B Precision Bipolar	2.36
*OP-297	0.05–0.2	0.6–2	0.1–0.2	0.5	0.15	—	2, 3, 6	I, M	SF-94	Precision, Low Power, Low I _B	†
OP-200	0.075–0.2	0.5–2	2–5	0.5	0.15	—	2, 3, 4, 6	I, M	P	Dual Monolithic, Precision	2.75
OP-270	0.075–0.25	1–3	20–60	5	2.4	—	2, 3, 4, 6	I, M	P	Dual Monolithic, Low Noise	3.50
OP-227	0.08–0.18	1–1.8	40–80	8	2.8	—	3	I, M	P	Dual Matched, Low Noise	5.85
OP-207	0.1–0.2	1.3–1.8	3–7	0.6	0.2	—	3	C, M	P	Dual Matched, Precision	8.40
OP-221	0.15–0.5	1.5–3	80–120	0.6	0.3	—	2, 3, 6, 7	C, I, M	P	Low Power, Single Supply	2.00
OP-220	0.15–0.75	1.5–3	20–30	0.2	0.05	—	2, 3, 6, 7	C, I, M	P	Micropower, Single Supply	2.13
OP-271	0.2–0.4	2–5	20–60	5	8.5	—	2, 3, 4, 6	I, M	P	Dual Monolithic, Fast, Low Noise	3.50
OP-290	0.2–0.5	3–5	15–25	0.02	—	—	2, 3, 4, 6	I, M	P	Micropower, Low Voltage Single Supply	2.50
AD647	0.25–1	2.5–10	0.035–0.075	1	3	—	4, 7	C, M	L	Dual AD547	5.80
*OP-285	0.25	—	150	8	20	—	2, 3, 6	—	SF-94	Dual High Performance, Low Power	†
*OP-295	0.25–1	—	10	0.08	0.02	—	2, 3, 6	—	SF-93	Dual Rail-to-Rail	†
AD746	0.5–1	10–20	0.15	13	75	0.5	2, 3, 6	C, I, M	L	Precision, Fast Settling, Dual AD744	4.25
AD648	0.3–2	3–20	0.01–0.02	1	1.8	8	2, 3, 6, 7	C, I, M	L	Low Power, BiFET, Dual AD548	1.25
AD712	0.3–3	5–20	0.05–0.075	4	20	1	2, 3, 6, 7	C, I, M	L	Excellent AC and DC Performance, Dual AD711	1.25
OP-10	0.5	2–4.5	3–7	0.6	0.17	—	3	C, M	P	Dual Matched, Precision	10.00
SSM-2139	0.5	2.5	80	30	11	—	2, 6	I	P, AV	Audio, Low Noise	1.85
OP-249	0.5–0.7	5–6	0.05–0.075	4.7	22	0.9–0.01	2, 3, 4, 6, 7	I, M	P	Fast, Low Distortion	1.25
AD642	0.5–2	1–3.5	0.035–0.075	1	3	—	7	C, M	L	Dual AD542	4.95
AD644	0.5–2	—	0.035–0.075	2	13	—	7	C, M	L	Dual AD544	5.20
OP-14	0.75–5	8–20	50–100	1.3	0.5	—	2, 3, 6, 7	I, M	P	General Purpose, Low Cost	2.50
*OP-275	1	—	150	8	20	—	2, 6	—	SF-92	Dual Audio Amp	†
OP-215	1–4	10	0.1–0.3	5.7	18	0.9–0.1	2, 3, 4, 6, 7	C, I, M	P	High Speed, Precision	2.50
*OP-282	2.0	10	0.1	4.0	9	1.5	2, 3, 6	I	SF-93	Dual High Speed, Low Power	†
AD827	4.0	15	7000	50	300	0.120–0.1	2, 3, 6	C, I, M	L	Dual AD847, High Speed, Low Power	5.31
OP-260	3.5–7	10	1000–15000	90	1000	0.25–0.1	2, 3, 4, 6, 7	I, M	P	Dual High Speed, Current Feedback	7.95

¹Unity gain small signal bandwidth.

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.



Selection Guides

Operational Amplifiers

Unity Gain Buffers

Model	−3 dB BW MHz typ	SR V/μs min	Settling Time to 0.02% ns typ	Rise Time 1V Step ns typ	I _{OUT} mA min	V _{OS} mV typ	I _{SS} mA max	Package Options	Temp Range	Page	Comments	Price 100s \$
AD9630	750	1800	8	0.9	50	3	26	2, 3, 6	I, M	L	High Performance, Wide-Band Buffer	6.25
AD9620	600	2200	8	0.8	40	2	48	1	I, M	L	High Performance, Low Harmonic Distortion Buffer	19.00

Programmable-Gain Amplifiers

Model	Gain Ranges	# of Channels	−3 dB BW MHz	V _{OS} mV typ	Settling Time to 0.01% μs typ	SR V/μs min	Package Options	Temp Range	Page	Comments	Price 100s \$
*AD75068	1–128	8	3	6	3	5	14	I	SF-95	Low Phase Shift, Constant Bandwidth, Software Programmable Gains from 1–128	80.00
*AD75062	1–128	2	3	6	3	5	1	I	SF-95	Low Phase Shift, Constant Bandwidth, Software Programmable Gains from 1–128	20.00
AD526	1, 2, 4, 8, 16	1	3.0	0.4	4.1	4	1, 2	C, I, M	L	Software Programmable μP Interface	5.25

Instrumentation Amplifiers

Model	Gain Ranges	Gain Error % max	Gain TC ppm/°C max	BW MHz typ ²	Package Options	Temp Range	Page	Comments	Price 100s \$
AMP-03	1	0.008	—	3.0	1.7	I, M	P	Precision Unity-Gain Differential Amplifier	2.75
AD625	1–10,000	0.02–0.05	5	0.65	1, 2	C, I, M	L	Resistor Programmable, Low Cost	6.95
AMP-02	1–10,000	0.02	50	1.20	2, 3, 6	I, M	P	High Accuracy, 8-Pin Package Single Resistor Gain Set	4.75
AD624	1, 100, 200, 500, 1000	0.02–1.0	5–25	1.0	1	I, M	L	Pin Programmable	11.90
AD524	1, 10, 100, 1000	0.02–2.0	5–100	1.0	1, 4	I, M	L	Pin Programmable, Input Protection	6.38
AD365	1, 10, 100, 500	0.05–0.1	5–10	0.8	8	I	L	Digitally Programmable with T/H	65.10
AD522	1–10,000	0.05–1.0	2–50	0.3	1	I, M	L	Resistor Programmable	37.80
AD521	0.1–1000	0.25–3.0	3–50	2	1	C, M	L	Resistor Programmable	11.65
AMP-05	0.1–2000	0.5	20	3.0	3	I, M	P	JFET Input, Fast Settling	6.90
AMP-01	0.1–1000	0.6	10	0.57	3, 4, 6	C, I, M	P	Low Noise, Precision	4.90
SSM-2141	1	0.01	—	3	2, 6	I	P, AV	High Common-Mode Rejection Differential Line Receiver	1.95
*SSM-2142	2	2	—	—	2, 6	I	SF-96, AV	Balanced Line Driver	2.95
AD620	1, 10,000	0.01–0.10	50	1.0	2, 3, 6	I, M	D	Low Cost in an 8-Pin SOIC	3.85
AD626	10, 100	0.2	150	0.1	2, 3, 6	I, M	D	Single Supply, High CMV	3.35
*SSM-2143	1/2, 2	0.1	—	7.0	2, 6	I	SF-96, AV	Gain of 0.5 for Unity Gain System When Used with SSM-2142	1.75

Isolation Amplifiers

Model	Peak Volt Iso V pk	Gain Range V/V	Gain Nonlin % max	Freq Resp kHz	Package Options	Temp Range	Page	Comments	Price 100s \$
284J	2500	1–10	0.05	1	Module	C	L	Medical, Single Channel, Low Cost	77.00
286J	2500	1–100	0.05–0.2	1	Module	C	L	Medical, Multichannel, Low Cost	79.00
289	2500	1–100	0.012–0.05	20	Module	C	L	Precision, Wide Bandwidth, Synchronized	74.00
290A	1500	1–100	0.1–0.25	2.5	Module	I	L	Single Channel, General Purpose	50.00
292A	1500	1–100	0.1–0.25	2.5	Module	I	L	Multichannel, General Purpose	50.00
AD202	1000–2000	1–100	0.025–0.05	2	2, 11	I	L	Lowest Cost, Small Size, Single Channel, –40°C to +85°C	28.00
AD203	2000	1–100	0.025	10	2	M	L	Rugged, Military Temperature Range, Wide Bandwidth	64.00
AD204	1000–2000	1–100	0.025–0.05	5	2, 11	I	L	Lowest Cost, Small Size, Multichannel, –40°C to +85°C	25.00
AD206	2000	1–10	0.015–0.03	100 kHz	11	I	L	100 kHz Bandwidth, Low Distortion Isolation Amplifier	60.00
AD208	1000–2000	1–1000	0.015–0.03	0.4–4 kHz	11	I	L	Precision, Low Cost, Single Channel, mV Input	32.00
AD210	3500	1–100	0.012–0.025	20	2	I	L	Precision, 3-Port Isolation, Wide Bandwidth	49.00
281					Module	C	L	External Oscillator for 286J and 292A Isolation Amplifiers	42.00
AD246					2, 11	C	L	External Oscillator for AD204 and AD208 Isolation Amplifiers	11.00

¹Temperature Range: –10°C to +55°C for SSM-2015, –25°C to +55°C for SSM-2016, and –40°C to +85°C for SSM-2017.

²Unity gain small signal bandwidth.

Boldface Type: Product recommended for new design.

*New product.



Selection Guides

Analog Multipliers/Dividers

Multipliers/Dividers

Model	BW MHz typ ¹	Accuracy % FS max	Supply Voltage	Output Voltage Swing	Package Options	Temp Range	Page	Comments	Price 100s \$
AD834	>500	±2	+4 V to ±9 V		2, 3, 6	C, I, M	L	Very High Speed, 4-Quadrant Mult/Div	11.70
AD539	60	±1.5–2.5	±4.5 V to ±15 V		1, 2, 4	C, M	L	High Speed, 2-Channel, 2-Quadrant Mult/Div	11.45
AD734	10	±0.25–0.4	±8 V to ±16.5 V	±12 V min	2, 3	I, M	L	Very High Accuracy Replacement for AD534	9.50
AD633	1	±2	±8 V to ±18 V	±11 V min	2, 6	C	L	Low Cost, 4-Quadrant Multiplier	3.75
AD532	1	±1–2	±10 V to ±22 V	±10 V min	1, 4, 7	C, M	L	Accurate 4-Quadrant Mult/Div	17.00
AD632	1	±0.5–1	±8 V to ±22 V	±11 V min	1, 7	I, M	L	High Accuracy Replacement for AD532	11.65
AD534	1	±0.25–1	±8 V to ±22 V	±11 V min	1, 4, 7	C, M	L	High Accuracy, 4 Quadrant Mult/Div	16.95
AD538	0.4	±0.5–1	±4.5 V to ±18 V	±11 V	1	I, M	L	Simultaneous Mult/Div/Exponentiator	18.37

Modulator/Demodulator

Model	Unity Gain BW MHz ¹	Gain	Slew Rate V/μs	Output Voltage Swing	Package Options	Temp Range	Page	Comments	Price 100s \$
AD630	2	±1, ±2	45	±10 V min	1, 2, 4	C, I, M	L	Balanced Modulator/Demodulator with 10 V FS Output	6.55

Signal Compression Components

Model	Input Range	Log Conformity RTI	BW kHz	Package Options	Temp Range	Page	Comments	Price 100s \$
755	1 nA–1 mA	0.5%	10	Module	I	L	Complete, Current and Voltage, 6 Decade, High Accuracy	74.00
757	1 nA–1 mA	0.5%	25	Module	I	L	Complete, Log/Antilog Ratio, 6 Decade, High Accuracy	84.00
759	20 nA–0.2 mA	1.0%	200	Module	I	L	Complete, Current and Voltage, 4 Decade, Lowest Cost	47.00
AD640	0.75 mV–200 mV	±0.6 dB	120 MHz	1, 2, 4, 5	C, I, M	L	120 MHz, 45 dB, DC Demodulating Logarithmic Amplifier	29.95
*AD600	±2 V	±0.5 dB	30 MHz	2, 6	C	SF-97	Dual 0 to +40 dB Variable Gain Amplifier	15.00
*AD602	±2 V	±0.5 dB	30 MHz	2, 6	C	SF-97	Dual –10 dB to +30 dB Variable Gain Amplifier	15.00

RMS-to-DC Converters

Model	Conversion Accuracy mV \pm %Read max	Full-Scale Range V RMS	dB Output Error dB max	Package Options	Temp Range	Page	Comments	Price 100s \$
SSM-2110	0.2 \pm 0.012	7	0.5	2	C	P, AV	High Accuracy, Wide Dynamic Range	3.50
AD737	(0.2 \pm 0.3)–(0.4 \pm 0.5)	0.2		2, 3, 6	C, I	L	Low Cost, Low Power, Power Down	2.98
AD736	(0.3 \pm 0.3)–(0.5 \pm 0.5)	0.2		2, 3, 6	C, I	L	General Purpose, Low Cost, Low Power	2.98
AD636	(0.2 \pm 0.3)–(0.5 \pm 0.6)	0.2	0.2–0.5	1, 7	C	L	Low Power	6.25
AD637	(0.5 \pm 0.2)–(1 \pm 0.5)	7	0.3 (typ)	1, 3, 6	C, M	L	High Accuracy, Wide Bandwidth	6.95
AD536A	(2 \pm 0.2)–(5 \pm 0.5)	7	0.3–0.6	1, 3, 4, 6, 7	C, M	L	General Purpose	7.55

Special Function Components

Model	Description	Package Options	Temp Range	Page	Price 100s—\$
AD639	Universal Trigonometric Function Converter	1	I, M	L	14.43
AD9500	Digitally Programmable Delay Generator	3, 4, 5	I, M	L	16.50
AD9501	TTL/CMOS Digitally Programmable Delay Generator	2, 4, 5	C, M	L	8.60
*AD9505	60 MHz “On the Fly” Programmable Delay Generator	5	C	SF-97	†
PKD-01	Monolithic Peak Detector with Reset-and-Hold Mode	2, 3	C, M	P	6.85
*ADXL-50	Monolithic Accelerometer with Signal Conditioning	1, 7	M	SF-98	49.95
*AD730	Programmable Clock Generator	6	C	SF-98	†
*AD720	RGB to NTSC/PAL Encoder	5	C	SF-99	†

Temperature Transducers

Model	I _{OUT} μA/K	V _{OUT} mV/K	Cal Error °C max	Nonlin °C max	Package Options	Temp Range	Page	Comments	Price 100s—\$	
AC2626	1	—	0.5–5	0.3–1.5	Steel Sheath	3/16" Stainless	C, M	L	General Purpose Temperature Probe 4" and 6" Length	34.00
AD590	1	—	0.5–5	0.3–1.5			M+	L	Wide Temperature Range, Accurate	2.50
AD592	1	—	0.5–2.5	0.15–0.35			I+	L	Low Cost, Accurate	2.95
*TMP-01	—	5	1.2–6	0.4–1.0			I, M+	SF-99	Complete Programmable Temperature Controller	2.75

¹Unity gain small signal bandwidth.

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.



Selection Guides

Signal Conditioning Components & Subsystems

Model	V/I Transmitters		Isolated	Sensor Excitation	Sensor Type(s)	IC	Hybrid Package	Module	Page	Price 100s \$
AD594/AD595					Thermocouple	X			L	6.93
AD596/AD597					Thermocouple	X			L	7.70
AD598				X	LVDT	X			L	19.95
AD693	X	X		X	mV: All	X			L	7.15
AD694		X		X	0-2 or 10 V Input Range	X			L	3.70
1B21	X		X		V-I			X	L	41.00
1B22		X	X		V-I			X	L	55.00
1B31				X	Strain Gage		X		L	47.00
1B32				X	Strain Gage		X		L	55.00
1B41			X	X	RTD			X	L	61.00
1B51			X		Thermocouple, mV			X	L	55.00
AC1226			Thermocouple Cold Junction Compensator				X		L	7.00
2B20		X			V-I			X	L	41.00
2B22		X	X		V-I			X	L	102.00
2B23		X	X		V-I, Pin Programmable			X	L	97.00
2B24	X		X		I-I			X	N	119.00
2B31				X	Strain Gage, RTD			X	L	70.00
2B50			X		Thermocouple, mV			X	L	113.00
2B52	X		X		Thermocouple, mV			X	N	251.00
2B53	X				Thermocouple, mV			X	N	179.00
2B54/2B55			X		Thermocouple, mV, 4-Channel			X	L	197.00
2B57	X			X	Solid State (AD590)			X	N	52.00
2B58				X	3-Wire RTD			X	N	194.00
2B59	X			X	3-Wire RTD			X	N	52.00
3B Series			Modular Signal Conditioning Subsystem, Flexible, User Configurable						N	†
5B Series			Modular Signal Conditioning Subsystem; System Applications						N	†
6B Series			Software Configurable, Digitizing Signal Conditioning Subsystem						N	†
7B Series			Low Cost, Modular Process Control Signal Conditioners						L	†

NOTE

For detailed information on 3B-7B Series, call 1-800-4-Analog and (for domestic versions only) request the *Data Acquisition and Control Catalog*. (For international versions, contact the local sales office.)



Digital Signal Processing Components

Fixed-Point Multipliers

Word Size	Model	Multiplication Time, ns ¹				I _{DD} ²		Twos Comp	Data Formats		Mixed Mode	Pins	Package Options	Logic Type	Page	Price 1000s \$
		Clocked		Unclocked					Unsign Mag.							
		Comm	MIL	Comm	MIL	Comm	MIL									
8×8	ADSP-1080A	J=45 K=33	S=55 T=45	N/A	N/A	45	55	X				40	1, 2, ³ 4	TTL	D	25.00
8×8	ADSP-1081A	J=45 K=33	S=55 T=45	N/A	N/A	45	55		X			40	1, 2, ³ 4	TTL	D	28.00
12×12	ADSP-1012A	J=75 K=50	S=90 T=60	J=105 K=80	S=125 T=95	60	70	X	X		X	64 68	1, 2 4, 5, 15	TTL	D	23.00
16×16	ADSP-1016A	J=85 K=70	S=95 T=80	J=105 K=90	S=120 T=105	65	55	X	X		X	64 68	1, 2 4, 15	TTL	D	20.00
24×24	ADSP-1024A	J=120 K=95	S=150 T=120	N/A	N/A	75	90	X				84	15	TTL ⁴	D	97.00

Multiplier/Accumulators

Word Size	Model	Multiplication Accumulate Time ¹		Accum Size	# of Accum	I _{DD} ²		Pins	Package Options	Page	Price 1000s \$
		Comm	MIL			Comm	MIL				
8×8	ADSP-1008A	J=60 K=50	S=75 T=60	19	1	40	45	48	1, 2	D	30.00
12×12	ADSP-1009A	J=85 K=70	S=100 T=85	27	1	70	75	64 68	1, 2 4, 15	D	30.00
16×16	ADSP-1010B	J=55 K=45	S=65 T=55	35	1	110	125	64 68	1 4, ³ 5, 15	D	18.00
16×16	ADSP-1101	J=90 K=80	S=105 T=95	40	2	75	75	100	15	D	126.00
16×16	ADSP-1110A	J=100 K=85	S=120 T=100	40	1	70	80	28	1, 2, 4, 5	D	37.00

Floating-Point Components

Model	Grade	# of Ports	Pipelined Throughput (ns)		Latency (ns)		IEEE Exact Divide (μs)		IEEE Exact Square Root (μs)		Package Options	Page	Price 100s \$
			32-Bit	64-Bit	32-Bit	64-Bit	32-Bit	64-Bit	32-Bit	64-Bit			
ADSP-3212	K	3	50	50	130	155	0.300	0.600			15	D	297.00
Multiplier/Divider	J	3	60	60	157	187	0.36	0.72					
ADSP-3222	K	3	50	50	130	155	0.8	1.5	1.45	2.90	15	D	297.00
ALU	J	3	60	60	157	187	0.96	1.8	1.74	3.48			

¹ns max @ T_A=+70°C Commercial, T_A=+125°C Military.

²mA max, f_{CLK}=max, V_{DD}=+5 V @ T_A=+70°C Commercial, +125°C Military.

³Contact factory.

⁴TTL levels of 0.8 V and +2.2 V.

Boldface Type: Product recommended for new design.

†Consult factory for price.



Selection Guides

Digital Signal Processing Components

Microcoded Support Components

PROGRAM SEQUENCER

Model	Grade	Program Address Size	Clock-to-Address Valid Delay	Minimum Cycle Time	Stack Depth	Number of Interrupts	Event Counters	Package Options	Page	Price 100s \$
ADSP-1402	J	16 Bits/64K Words	25 ns	70 ns	64 Words	10	4	15	D	68.00
	K	16 Bits/64K Words	15 ns	65 ns	64 Words	10	4	15	D	

REGISTER FILE

Model	Word Size Bits	Cycle Rate ns	# of 16-Bit Ports	Bandwidth Bits/ μ s	# of Transfer Cycles	Bidirectional Port	Technology	Package Options	Page	Price 100s \$
ADSP-3128A	128 \times 16 or 64 \times 32	50	5	3,200	5	1	CMOS	15	D	145.00

Processors and Development Tools

Model	Cycle Time (ns)	Speeds (MHz)	Temperature ¹ Ranges	Package Options	Page	Price 100s \$
ADSP-2100	166	24	0°C to +70°C	10, 12, 15	D	65.00
	125	32	-55°C to +125°C			
ADSP-2100A	100	40	0°C to +70°C	10, 12, 15	D	76.00
	80	50	-55°C to +125°C			
ADSP-2101	100	40	0°C to +70°C	5, 15	D	45.00
	80	50	-40°C to +85°C			
	60	66	-55°C to +125°C			
*ADSP-2105	100	40	0°C to +70°C	5	SF-100	12.00
*ADSP-2111	77	52	0°C to +70°C	10, 15	SF-101	69.00
		66	-40°C to +85°C			
			-55°C to +125°C			
*ADSP-21msp50	77	52	0°C to +70°C	10, 15	SF-102	84.00
*ADSP-21020	60	66	-40°C to +85°C	PGA, PPGA	SF-104	177.00
	80	80				
	80	100				
*ADSP-21010	80	50	K, B	PQFP	D	75.00

Processors and Development Tools

Model	Product Description	Page
SOFTWARE SUPPORT TOOLS†		SF-105, SF-106
*ADDS-21XX-DSW-PC	IBM-PC‡ version of development software for the ADSP-2100 Family.§ Includes assembler, simulator, linker, splitter, builder and runtime library.	
*ADDS-21XX-DSW-SUN	SUN4 version of development software for the ADSP-2100 Family. Includes assembler, simulator, linker, splitter, builder and runtime library.	
*ADDS-21XX-BUN-PC	IBM-PC version of development software for the ADSP-2100 Family. Includes assembler, simulator, linker, splitter, builder, runtime library and C-compiler.	
*ADDS-21XX-BUN-SUN	SUN4 version of development software for the ADSP-2100 Family. Includes assembler, simulator, linker, splitter, builder, runtime library and C-compiler.	
*ADDS-21XX-BUN-VAX	VAX version of development software for the ADSP-2100 Family. Includes assembler, simulator, linker, splitter, builder, runtime library and C-compiler.	
*ADDS-21XX-C-UP-PC	Upgrade from ADDS-21XX-DSW-PC to ADDS-21XX-BUN-PC	
*ADDS-210XX-DSW-PC	IBM-PC version of development software for the ADSP-21000 Family.¶ Includes assembler, simulator, linker, splitter, and runtime library.	
*ADDS-210XX-DSW-SUN	SUN4 version of development software for the ADSP-21000 Family. Includes assembler, simulator, linker, splitter, and runtime library.	
*ADDS-210XX-BUN-SUN	SUN4 version of development software for the ADSP-21000 Family. Includes assembler, simulator, linker, splitter, runtime library and C-compiler.	
*ADDS-210XX-BUN-PC	IBM-PC version of development software for the ADSP-21000 Family. Includes assembler, simulator, linker, splitter, runtime library and C-compiler.	
HARDWARE SUPPORT TOOLS†		SF-107, SF-108, SF-109
*ADDS-2101-EZ-KIT	ADSP-2101/ADSP-2105 low cost development starter package. Includes software package and evaluation board.	
*ADDS-2101-EZ-LAB	ADSP-2101 evaluation board.	
*ADDS-2111-EZ-LAB	ADSP-2111 evaluation board.	
*ADDS-2101-EZ-ICE	ADSP-2101 low cost compact in-circuit emulator.	
*ADDS-2111-EZ-ICE	ADSP-2111 low cost compact in-circuit emulator.	
*ADDS-2100A-ICE	ADSP-2100A 12.5 MHz full featured in-circuit emulator.	
*ADDS-2101-ICE	ADSP-2101 16.6 MHz full featured in-circuit emulator.	
*ADDS-2111-ICE	ADSP-2111 16.6 MHz full featured in-circuit emulator.	
*ADDS-2100A-ICE-FKIT	Full featured in-circuit emulator conversion kit; converts 2101-ICE to 2100A-ICE	
*ADDS-2101-ICE-FKIT	Full featured in-circuit emulator conversion kit; converts 2100A-ICE to 2101-ICE.	
*ADDS-2101-ICE-PKIT	Full featured in-circuit emulator conversion kit; converts 2111-ICE to 2101-ICE.	
*ADDS-2111-ICE-FKIT	Full featured in-circuit emulator conversion kit; converts 2100A-ICE to 2111-ICE.	
*ADDS-2111-ICE-PKIT	Full featured in-circuit emulator conversion kit; converts 2101-ICE to 2111-ICE.	
*ADDS-21020-EZ-LAB	ADSP-21020 evaluation board.	
*ADDS-21020-EZ-ICE	ADSP-21020 low cost compact in-circuit emulator.	
SUPPORT TOOLS ACCESSORIES†		
*ADDS-2100A-UMBIL	Umbilical cable for the ADSP-2100A in-circuit emulator.	
*ADDS-2101-UMBIL	Umbilical cable for the ADSP-2101 in-circuit emulator and EZ-ICE™.	
*ADDS-2111-UMBIL	Umbilical cable for the ADSP-2111 in-circuit emulator and EZ-ICE™.	
*ADDS-21XX-LMP	In-circuit emulator logic module probe.	
*ADDS-101LADAPT	101 lead adaptor socket for the ADSP-2100A and ADSP-2111 umbilical cable.	
*ADDS-2100-PGA/PQFP-N	ADSP-2100A PGA to PQFP surface mount adapter.	
*ADDS-2100-PGA/PQFP-S	ADSP-2100A PGA to PQFP socket mount adapter.	
TRAINING COURSES		
*ADDS-2190	ADSP-2100 Family 3-Day Workshop. Offered in Norwood, MA; California; Europe.	

Boldface Type: Product recommended for new design.

EZ-ICE and EZ-LAB are trademarks of Analog Devices, Inc.

*New Product.

†Consult factory for price.

‡IBM PC is a trademark of International Business Machines Corporation.

§The ADSP-2100 Family supports the following processors: ADSP-2100A, ADSP-2101, ADSP-2102, ADSP-2105, ADSP-2106, ADSP-2111, ADSP-2112 and ADSP-21msp50.

¶The ADSP-21000 Family supports the following processors: ADSP-21020 and ADSP-21010 (under development).

Selection Guides

Data Acquisition Subsystems

Model	Resolution Bits	Throughput Rate kHz	No. Channels	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD1341	12	150	16/8	16	12	C, M	C II	Complete, Programmable DAS with Fast Bus Interface	198.00
AD1332	12	125	1	12	1	I, M	C II	Complete 12-Bit 125 kHz Sampling ADC, On-Chip FIFO	142.80
AD1334	12	65	4	12	1	I, M	C II	Four-Channel 12-Bit Sampling ADC, On-Chip FIFO	180.00
AD364	12	20	16/8	12	1	C, M	C II	High Speed 16-Channel 12-Bit DAS	168.10
AD363	12	25	16/8	12	1	C, M	C II	16-Channel 12-Bit DAS	270.00
AD1362			16/8			C, M	C II	16-Channel Analog Front-End for 12-Bit ADC	148.60
AD7850	12	10	1	Serial	2, 5	C	C II	Small Signal DAS with Instrumentation Amplifiers and Reference	†
DAS1152	14	25	1	14	1	I	C II	14-Bit High Accuracy Sampling ADC	254.00
DAS1157	14	18	1	14	1	I	C II	Low Power 14-Bit Sampling ADC	254.00
DAS1153	15	25	1	15	1	I	C II	15-Bit High Accuracy Sampling ADC	317.00
DAS1158	15	18	1	15	1	I	C II	Low Power 15-Bit Sampling ADC	305.00
DAS1159	16	18	1	16	1	I	C II	Low Power 16-Bit Sampling ADC	334.00
AD7716	20	0.30	1	Serial	2, 6	C	C II	Quad 20-Bit Sigma Delta ADC, Low Power	†

Digital Panel Meters

Model	Digits	FS Range	Data Output	Display Type	Page	Comments	Price 100s \$
AD2026	3	-99 mV to +999 mV	N/A	LED	C I	+5 V Power	60.00
AD2010	3 1/2	±199.9 mV	BCD	LED	C I	+5 V Power	311.00
AD2021	3 1/2	±199.9 mV, ±1.999 V, ±19.99 V	Serial	LED	C I	+5 V Power	207.00

Complete Analog I/O Ports

General Purpose

Model	Resolution Bits	Conv Time max μ s	SHA BW kHz typ	Settling Time μ s	Ref. Volt Int/Ext	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7569	8	2	500	1	Int	8, μ P	2, 3, 4, 5, 6	C, I, M	C II	CMOS, Complete I/O Port with DAC, ADC, SHA, Amps and Reference	6.00
AD7669	8	2	500	1	Int	8, μ P	2, 5, 6	C, I, M	C II	CMOS, Complete I/O Port with 2 DACs, ADC, SHA, Amps, and Reference	9.50
AD7769	8	3	500	2.5	Ext	8, μ P	2, 5	C	C II	CMOS, Two-Channel ADC/DAC with Output Amplifiers	12.50
AD7868	12	10	500	3	+3 V, Int	Serial, μ P	2, 3, 6	I, M	C II	CMOS, Complete I/O Port with 12-Bit ADC and 12-Bit DAC	24.00
AD7869	14	10	500	3.5	+3 V, Int	Serial, μ P	2, 3, 6	C, I, M	C II	CMOS, Complete I/O Port with 14-Bit ADC and 14-Bit DAC	32.00

Disk Drive Servo

Model	ADC Resolution Bits	Conv Time max μ s	DACs Resolution Bits	Settling Time μ s	Ref. Volt Int/Ext	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7774	8	3	8 11	4 8	Int/Ext	8, μ P	2, 5	C	C II	CMOS, I/O Port with 4-Channel, 8-Bit ADC, 11-Bit and Two 8-Bit DACs	23.20
AD7773	10	3	8 10	3 4	2.1 V, Int	10, μ P	6	C	C II	Complete Embedded Servo Front End for Hard Disk Drive with Separate Address and Data Pins	†
AD7775	10	3	8 10	3 4	2.1 V, Int	10, μ P	6	C	C II	Same as the AD7773 Except with Multiplexed Address/Data Bus	†

Communications

Model	DAC/ADC Resolution Bits	DAC/ADC SNR + THD dB	Through-put kSPS	Ref. Volt Int/Ext	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7001	10/8	56/44	2170	2.5 V, Int	10, 8 Serial, μ P	10	C ¹	C I	GSM Baseband I/O Port	†
AD7002	10/12	—/62	4333 (DAC) 541.7 (ADC)	2.5 V, Int	Serial, μ P	10	C ¹	C I	GSM Baseband I/O Port with On-Board GMSK Modulator	†
AD7005	10/12	—/62	97.2 (DAC) 194.4 (ADC)	2.3 V, Int	Serial, μ P	10	C ¹	C I	TIA Baseband I/O Port	†
AD28msp02	16/16	65/65	8	2.5 V, Int	Serial, μ P	6	C	C I	Complete Voice Band Linear Codec with On-Chip Filtering	†
AD28msp01	16/16	80/80	7.2/8.0/9.6	2.5 V, Int	Serial, μ P	6	C	C I	Complete Analog Front End for High Performance DSP-Based Modems	†

¹Operates to -25°C .

Boldface type: Product recommended for new design.

*New product.

†Consult factory for price.



Pin Drivers

Model	Speed MHz	V _{RANGE}	Slew Rate at 5 V (V/ns)	Output Capacitance pF	Linearity % of V _{REF}	Package Options	Temp Range	Page	Price 100s \$
AD1324	200	–2 V to 7 V	1.8	3.5	0.15	12	C	L	85.00
AD1321	100	–2 V to 7 V	1.25	8	0.5	12	C	L	45.00
*AD1320	40	–12 V to +12 V	0.5	20	0.5	3	C	SF-110	36.00

Comparators

Model	Prop Delay ns	Common-Mode Range	Dispersion ps	Input Capacitance pF typ	Input Offset mv max	Package Options	Temp Range	Page	Price 100s \$
AD1317	2.5	–2 V to 7 V	250	2 (max)	±10	12	C	L	25.00
AD9685	3.5	–2.5 V to 5 V	50	2	2	3, 4, 5, 7	I, M	L	3.25
AD9687‡	3.5	–2.5 V to 5 V	50	2	2	3, 4, 5	I, M	L	4.90
AD9696	7.0	–2.2 V to 3.7 V	100	3	2	2, 3, 6, 7	C, M	L	3.50
AD9698‡	7.0	–2.2 V to 3.7 V	100	3	2	2, 3, 6	C, M	L	6.00

Active Load

Model	Prop Delay ns	Program Current mA	Input Leakage nA	V _{OUT} Capacitance pF	Package Options	Temp Range	Page	Price 100s \$
AD1315	1.5	±50	±200	2	12	C	L	40.00

Delay Generators

Model	Description	Package Options	Temp Range	Page	Price 100s \$
AD9500	ECL Digitally Programmable	3, 4, 5	C, M	L	16.50
AD9501	TTL/CMOS Digitally Programmable	2, 3, 5	C, M	L	8.60
*AD9505	60 MHz “On the Fly” Programmable Delay Generator	5	C	SF-97	†

Parametric Measurement Components

Model	Description	Package Options	Temp Range	Page	Price 100s \$
AD676	16-Bit, 10 μs Sampling ADC	1, 2	C, I, M	C II	39.00
AD1376	16-Bit, 10 μ s ADC	1	C	C II	103.00
AD1380	16-Bit, 20 μs Sampling ADC	1	C	C II	126.00
AD1382/AD1385	16-Bit, 2 μs ADC	1	C, M	C II	595.00

Custom Voltage/Current Force/Sense Functions

Level-Setting Components

Model	Description	Package Options	Temp Range	Page	Price 100s \$
AD664	Quad 12-Bit DAC, V_{OUT} Reset, Readback	1, 2, 4, 5	C, I, M	C I	34.50
AD7228	Octal 8-Bit DAC, V_{OUT}	2, 3, 4, 5, 6	C, I, M	C I	32.00
AD7244	Dual 14-Bit DAC, V_{OUT}, Ref, Serial I/O	2, 3, 6	C, I, M	C I	17.95
AD7568	Octal 12-Bit DAC, I_{OUT}, Serial I/O	10	I	C I	28.00
AD75004	Quad 12-Bit DAC, V_{OUT}, Reference	2, 5	C	C I	34.50
AD75069	Octal 12-Bit DAC, V_{OUT}, Readback, Ref	5, 14	C, I	C I	70.00
DAC-8412	Quad 12-Bit DAC, V_{OUT}, Reset to Midscale	1, 2, 4, 5	I, M	C I	34.50
DAC-8413	Quad 12-Bit, DAC, V_{OUT}, Reset to Zero	1, 2, 4, 5	I, M	C I	34.50
SMP-08	Octal Mux/SHA, 4 μs Acquisition Time	2, 3, 6	I, M	C II	6.25
SMP-18	Octal Mux/SHA, 2 μs Acquisition Time	2, 3, 6	I	C II	6.95

Custom Multiple-DAC and/or Multiple-SHA Functions

Industry's Broadest Selection of DACs, from 8 to 20 Bits

Multiplexer

Model	Description	Package Option	Temp Range	Page	Price 100s \$
AD75019	16 \times 16 Analog Crosspoint Switch	5	C, I	C II	15.00

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

‡Dual Comparators

Selection Guides

Mass Storage Components

Optical Storage Component

Model	Description	Package Options	Temp	Page	Price 100s \$
AD880	Optical Disk Drive Data/Servo Channel Processor	6	C	L	†

Magnetic Storage Components

Model	Description	Package Options	Temp	Page	Price 100s \$
AD890	Precision, Wideband Channel Processing Element	3, 5	C	L	10.00
AD891	Rigid Disk Data Channel Qualifier	3, 5	C	L	10.00
AD891A	50 Mb/s Rigid Disk Data Qualifier	5	C	L	10.00
AD892T/E	30 Mb/s Peak Detector	5	C	L	8.50
*AD896	Programmable Filter	2, 6	C	SF-110	7.45
AD897	40 Mb/s Peak Detector and Data Synchronizer	10	C	L	20.00

Servo Components§

Model	Description	Package Options	Temp	Page	Price 100s \$
AD7569	Complete, 8-Bit Analog I/O Port with DAC, ADC, SHA, Amps, and Reference	2, 3, 4, 5	C, I, M	C	6.00
AD7669	Complete, 8-Bit Analog I/O Port with 2 DACs, ADC, SHA, Amps, and Reference	2, 5	C, I, M	C	9.50
AD7769	8-Bit Analog I/O Port with Two-Channel ADC/DAC	2, 5	C	C	12.50

Automotive Components

Model	Description	Package Options	Temp Range	Page	Price 10,000s \$
*AD22001	5-Channel Monolithic Comparator for Lamp Monitoring	2	-40°C to +125°C	SF-111	2.50
*AD22050	Single-Supply Sensor Interface Circuit	2	-40°C to +125°C	SF-111	2.30
*AD22100	Monolithic Temperature Sensor with Signal Conditioning	2, 7, 11	-50°C to +150°C	SF-111	1.45
*AD22150	Monolithic Hall Effect Sensor with Signal Conditioning	11	-40°C to +150°C	SF-111	2.50
*AD22180	Battery Monitor Circuit	2, 11	-55°C to +125°C	SF-111	1.65
*AD22181	Alternator Control Circuit	7	-55°C to +125°C	SF-111	†
*ADXL50	Monolithic Accelerometer with Signal Conditioning	1, 7	-55°C to +125°C	SF-111	24.62
*TMP-01	Low Power Programmable Temperature Controller	2, 3, 6, 7, 11	-55°C to +155°C	SF-111	2.75

Audio Products

Audio Preamplifiers

Model	en typ nV/\sqrt{Hz} 20 kHz BW	THD+N typ G=1000 @ 1 kHz %	Slew Rate typ V/ μ S	BW typ G=100, MHz	Package Options	Temp Range	Page	Comments	Price 100s—\$
SSM-2015	1.3	0.007	8	0.7	2	C	P, AV	Low Noise Microphone Preamplifier	3.65
SSM-2016	0.8	0.009	10	1.0	2	C	P, AV	Lowest Noise, Wide Supply Voltage Range	4.65
*SSM-2017	0.95	0.012	17	1.0	2, 6	I	SF-95, AV	Ultralow Noise at Ultralow Cost	1.80

Voltage Controlled Amplifiers

Model	# of VCAs	THD % typ ¹	Dynamic Range dB typ	Gain Core Class	Package Option	Temp Range ²	Page	Comments	Price 100s—\$
SSM-2013	1	0.01	107	A	2	C	P, AV	Low Cost, Single	2.60
*SSM-2018	1	0.006	118	A/AB	2, 6	I	SF-113, AV	Highest Performance; No External Op Amp Required	3.00
SSM-2120	2	0.012	100	A	2	C	P, AV	Dynamic Range Processor, 2 VCAs & 2 Level Detectors	4.15
SSM-2122	2	0.012	100	A	2	C	P, AV	Excellent Price/Performance	4.00
SSM-2024	4	0.1	82	A	2	C	P, AV	Low Cost, Current Controlled Amplifier	2.85

Other Audio Products†

Model	Reference	Page	Price—100s—\$	Model	Reference	Page	Price—100s—\$
AD1856	Voltage Output DACs	C I	12.60	SSM-2131	High Speed Amplifiers	P, AV	1.95
AD1860	Voltage Output DACs	C I	14.05	SSM-2134	Low Noise Amplifiers	P, AV	1.25
AD1862	Current Output DACs	C I	17.20	SSM-2139	Dual Op Amp	P, AV	1.85
AD1864	Multiple DACs	C I	20.45	SSM-2141	Instrumentation Amplifiers	P, AV	1.95
AD1868	Multiple DACs	C I	11.70	*SSM-2142	Instrumentation Amplifiers	SF-96, AV	2.95
AD711	High Speed Amplifiers	L	0.80	*SSM-2143	Differential Line Receiver	SF-96, AV	1.75
AD712	Dual Amplifiers	L	1.25	SSM-2210	Matched Transistors	P, AV	1.50
AD713	Quad Amplifiers	L	3.50	SSM-2220	Matched Transistors	P, AV	1.95
AD829	High Speed Amplifiers	L	2.95	SSM-2402	Analog Bipolar JFET Switches	C II, AV	3.53
SSM-2110	RMS-to-DC Converters	P, AV	3.50	SSM-2412	Analog Bipolar JFET Switches	C II, AV	3.53
*SSM-2125/SSM-2126	Dolby Pro-Logic Decoder	SF-114, AV	15.00	*OP-275	Audio Amplifier	SF-92	†

¹THD: G = ± 20 dB @ 1 kHz.

²Temperature Range: -10°C to $+55^{\circ}\text{C}$ for SSM-2013, SSM-2014, SSM-2120, SSM-2122 and SSM-2024.

³Operates to -25°C .

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.

§For more information, see Complete Analog I/O Ports section.

¶These products are described in Selection Guides appearing in other sections of this Short Form Designers' Guide. Please refer to the section and page indicated for more information on a specific device.



Selection Guides

Communications Products

Analog I/O Ports

Model	DAC/ADC Resolution Bits	DAC/ADC SNR + THD dB	Through-put kSPS	Ref. Volt Int/Ext	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7001	10/8	56/44	2170	2.5 V, Int	10, 8, Serial, μ P	10	C ³	C I	GSM Baseband I/O Port	†
AD7002	10/12	—/62	4333 (DAC) 541.7 (ADC)	2.5 V, Int	Serial, μ P	10	C ³	C I	GSM Baseband I/O Port with On-Board GMSK Modulation	†
AD7005	10/12	—/62	97.2 (DAC) 194.4 (ADC)	2.3 V, Int	Serial, μ P	10	C ³	C I	TIA Baseband I/O Port	†
AD7868	12/12	72/72	83	3.0 V, Int	Serial, μ P	2, 3, 6	I, M	C II	Complete 12-Bit Analog I/O System	24.00
AD7869	14/14	78/78	83	3.0 V, Int	Serial, μ P	2, 3, 6	C, I	C II	Complete 14-Bit Analog I/O System	32.00
AD28msp02	16/16	65/65	8	2.5 V, Int	Serial, μ P	6	C	C I	Complete Voice Band Linear Codec with On-Chip Filtering	†
AD28msp01	16/16	80/80	7.2/8.0/9.6	2.5 V, Int	Serial, μ P	6	C	C I	Complete Analog Front End for High Performance DSP-Based Modems	†

Analog Filters

Model	SNR (typ) dB	Bus Interface	Package Options	Temp Range	Page	Comments	Price 100s \$
AD7341	75	Parallel, μ P	2, 5	C	C I	Voiceband Reconstruction Filter	16.50
AD7371	75	Parallel, μ P	2, 5	C	C I	Voiceband Antialiasing Filter	19.50

Frequency Synthesis

Model	Bus Interface	Package Options	Temp Range	Comments	Page	Price—100s—\$
AD7008	8/16 μ P	10	C ¹	DDS IF Modulator with 32-Bit Phase Accumulator and 10-bit DAC, 20 MHz Output Capability, Single 5 V Supply, Low Power	C I	†
AD9901		3, 4, 5	C, M	Ultrahigh Speed Digital Phase/Frequency Discriminator, No “Dead Zone,” Linear Transfer Function up to 200 MHz, for PLLs	C I	3.50
AD9950	8/16 μ P	14	C, M	32-Bit, 300 MSPS Phase Accumulator for DDS, On-Board Quad Logic	C I	99.95

Telecommunications

Model	Description	Package Options	Temp Range	Page	Price—100s—\$
LIU-01	Serial Data Receiver Reconstructs Clock and Data	2, 3, 6	I	C I	7.25
RPT-82	T1/E1 PCM Repeater Featuring Automatic ALBO	3, 6	I	C I	3.67
RPT-83	T1/E1 PCM Repeater with ALBO and Clock Shutdown Circuit	3, 6	I	C I	4.76
RPT-85	T1/E1 PCM Repeater with XR-T445 Pinout	3, 6	I	C I	4.75
RPT-86	T1/E1 Low Power PCM Repeater with ALBO	2, 3, 6	I	C I	4.95
RPT-87	T1/E1 Low Power PCM Repeater with ALBO and Clock Shutdown Circuit	2, 3, 6	I	C I	4.95

Line Drivers/Receivers

Model	Power Supply Voltage	No. of Drivers	No. of Receivers	External Capacitors	Low Power Shutdown (SD)	TTL Three-State \overline{EN}	No. of Pins	Package Options	Temp Range	Page	Price 100s—\$
AD230	+5 V	5 (232)	0	4	Yes	No	20	2, 3, 6	C, I	C I	2.70
AD231	+5 V & 7.5 V to 13.2 V	2 (232)	2 (232)	2	No	No	14	2, 3, 6	C, I, M	C I	1.35
AD231A	+5 V & 7.5 V to 13.2 V	2 (232)	2 (232)	2	No	No	14	2, 3, 6	C, I, M	C I	2.20
AD232	+5 V	2 (232)	2 (232)	4	No	No	16	2, 3, 6	C, I, M	C I	2.05
AD232A	+5 V	2 (232)	2 (232)	4	No	No	16	2, 3, 6	C, I, M	C I	2.90
AD233	+5 V	2 (232)	2 (232)	None	No	No	20	2	C, I	C I	3.75
AD233A	+5 V	2 (232)	2 (232)	None	No	No	20	2	C, I	C I	†
AD234	+5 V	4 (232)	0	4	No	No	16	2, 3, 6	C, I	C I	2.05
AD235	+5 V	5 (232)	5 (232)	None	Yes	Yes	24	2, 3	C, I	C I	7.25
AD236	+5 V	4 (232)	3 (232)	4	Yes	Yes	24	2, 3, 6	C, I, M	C I	3.65
AD237	+5 V	5 (232)	3 (232)	4	No	No	24	2, 3, 6	C, I	C I	3.40
AD238	+5 V	4 (232)	4 (232)	4	No	No	24	2, 3, 6	C, I, M	C I	3.40
AD239	+5 V & 12 V	3 (232)	5 (232)	2	No	Yes	24	2, 3, 6	C, I, M	C I	3.00
AD241	+5 V	4 (232)	5 (232)	4	Yes	Yes	28	6	C, I	C I	4.70
AD7306	+5 V	2 (232)	1 (232)	4	No	No	24	6	C, I	C I	†
		1 (422)	1 (232/422)								

¹Operates to -25°C .

Boldface Type: Product recommended for new design.

*New product.

†Consult factory for price.



Mixed-Signal Application Specific Integrated Circuits

Analog Devices offers a full spectrum of signal conditioning and conversion capabilities in mixed-signal application specific integrated circuits (ASICs). These chip-level systems can implement combined analog/digital designs with 10- to 14-bit accuracy and 12- to 20-bit resolution that formerly required board-level solutions. Combined with our general purpose DSPs from the ADSP-2100 and ADSP-21000 families, our ASICs can provide custom two-chip solutions to meet complex system requirements.

Analog Devices can incorporate most of the functions of its standard monolithic linear and converter parts in full-custom and semicustom ICs. Full-custom parts optimize performance and space requirements, while cell-based semicustom parts reduce development time and engineering expense. Development costs can be cut further by tailoring a predefined system-on-a-chip known as a Linear System Macro to your application.

Analog's experienced design engineers work with powerful computer-aided design tools to design and lay out your circuit. Design centers are currently in Massachusetts, Japan and Ireland.

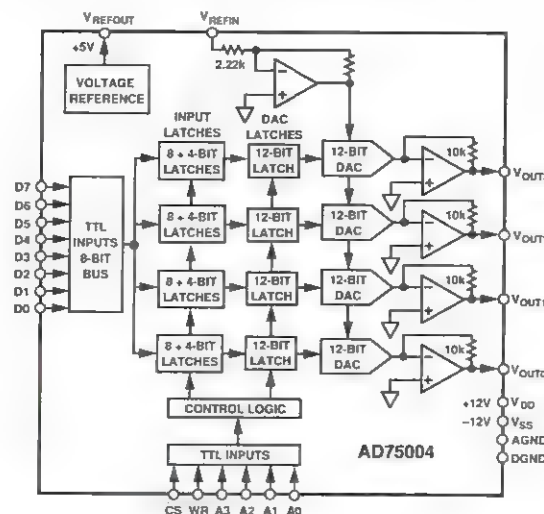
Multiple locations for fabrication, assembly and testing ensure a ready supply of production parts. Products are processed in our MIL-38510 certified facilities.

DESIGN EXAMPLES

Analog Devices has created a variety of customer-specific and function-specific ASICs for data acquisition and signal processing. Two examples of cell-based designs are the following application specific standard products (ASSPs).

AD75004 Quad DAC

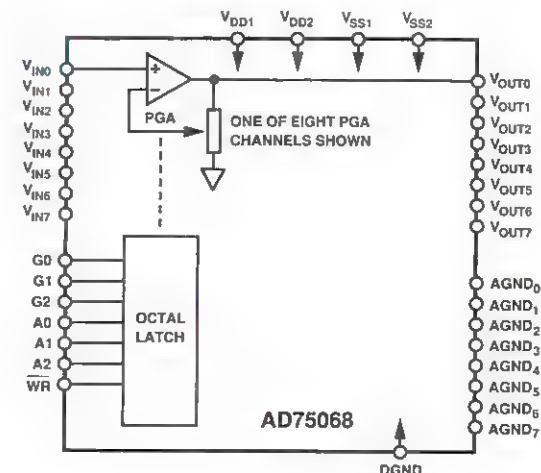
This circuit contains four separate 12-bit D/A converters with amplifiers for voltage output and an on-board reference. Double-buffering latches interface with an 8-bit parallel bus and permit updating of all four channels individually or simultaneously. Outputs swing ± 5 V, drive ± 5 mA, and settle within 4 μ s.



AD75068 Octal Programmable Gain Amplifier

The AD75068 contains eight programmable gain amplifiers (PGAs). Each is complete, including switch/resistor network and gain programming latch, and requires no external components. Each channel may be independently programmed for gains from 1 to 128. A

unique circuit design maintains constant 2 MHz bandwidth at all gains and offers very low phase shift; the PGAs also feature low input bias current (<4 pA).



Derivative Circuits

The circuits outlined above can be modified to suit a specific customer's application. For example, the AD75004 quad DAC could be expanded to 6 channels, each of which may have separate reference inputs. The AD75068 could be configured to include filtering. These modifications, when based on standard library cells, can provide the fastest, most cost effective semicustom solution.

Analog/Digital BiCMOS Processes

Analog Devices fabricates ASICs and USICs in four bipolar-CMOS processes, which are also used for volume production of standard ICs. All of these processes are optimized for analog and mixed-signal circuits and handle wide dynamic ranges. They combine bipolar and CMOS transistors with accurate resistors on one chip.

The bipolar transistors provide precision, low noise, low offset input stages and moderate-power output stages. The CMOS devices make low power logic; switches for analog multiplexers, data converters, and switched-capacitor filters; and high impedance input stages and current sources for linear circuitry. The thin-film resistors are very stable over time and temperature, and may be laser-trimmed for tight tolerance on relative matching and absolute values.

The BiMOS II Process

BiMOS II has the most comprehensive cell library of Analog's BiCMOS processes; highlights of the library are listed below. With supply voltages up to 24 V and its very low noise, it can handle signals with a dynamic range of over 20 bits.

BiMOS II features high quality NPN transistors that have very low noise, tight matching, and high Early voltage. These characteristics make possible high performance amplifiers and comparators with low offset input stages and excellent linearity, as well as stable bandgap references.

The 3- μ CMOS builds logic as well as analog switches and high impedance input stages and current sources. The exceptionally stable thin-film resistors are used in precision data converters, programmable-gain amplifiers, and other linear circuits.

BiMOS II uses two levels of metal interconnect as well as self-aligned polysilicon to reduce chip area and layout time. It is fabricated on epitaxial wafers that minimize crosstalk, leakage, and ESD susceptibility.

The BiMOS II process can operate with supplies up to 24 V; the cell library is designed to run on ± 12 V supplies. Most BiMOS II cells are designed to accommodate ± 5 V signals, although some cells can handle ± 8 V or ± 10 V swings.

Other Processes

While BiMOS II is used for most cell-based USICs, Analog Devices fabricates USICs in three other processes which may be used in applications that require higher speed, lower noise, or higher supply voltage. ABCMOS (Advanced Analog BiCMOS) is our newest, fastest, and densest BiCMOS process. It features 2-GHz NPN devices and fine-geometry CMOS and runs on ± 5 V supplies, with ± 3 V signal swings. LC²MOS (Linear-Compatible CMOS) has two variants: one runs on ± 5 V supplies, with ± 3 V signal swings; the other runs on ± 15 V, with ± 10 V swings. LC²MOS also includes JFETs for very low input noise at high input impedance, and buried Zener diodes with better noise and drift than many bandgap references.

The table below compares our BiCMOS USIC processes and highlights the key features of each. Analog Devices will review your application and recommend the appropriate bipolar process for your needs.

ANALOG DEVICES HIGH PERFORMANCE BiCMOS PROCESSES FOR ASICs

Process	Supply Voltage	Gate Length	f_T	Gate Capacity	Features
BiMOS II	24 V	3 μ	300 MHz	2,000	Large Cell Library
ABCMOS	12 V	2 μ	2 GHz	10,000	Highest Speed, Density
LC ² MOS-2	12 V	2 μ	1 GHz	5,000	JFET, Buried Zener
LC ² MOS-5	30 V	5 μ	1 GHz	1,000	JFET, Buried Zener

Mixed-Signal Application Specific Integrated Circuits

BiMOS II Cell Library

The following table lists key examples of analog and converter cells in the BiMOS II library. Logic cells include gates, counters, registers, microsequencer, PLA, RAM and ROM. Interface cells include 8-bit and 16-bit parallel I/O ports as well as synchronous serial ports and UARTs.

Analog-to-Digital Converter

ADC1210 12-bit resolution, 15 μ s conversion time, ± 5 V input range, SAR type

Amplifiers

AMPBH10 Bipolar input op amp; gain > 120 dB, BW > 1.6 MHz, offset < 0.5 mV
AMPBH20 Bipolar input op amp; uncompensated, bandwidth > 2.75 MHz at gain ≥ 4
AMPBH30 Bipolar input instrument amplifier; CMRR ≥ 75 dB, nonlinearity < 20 ppm
AMPBH40 Bipolar input op amp; I_B < 1 nA, gain > 120 dB, offset < 0.5 mV
AMPMH10 MOS input op amp; I_B < 50 pA, gain > 120 dB, bandwidth > 1.6 MHz

Comparator

CMPBH10 Bipolar input comparator; clocked; prop delay < 130 ns at 1 mV overdrive

Digital-to-Analog Converters

DAC0810 8-bit res., settling time < 70 ns, 0–248 μ A output, INL & DNL < 0.25 LSB
DAC1210 12-bit res., settling time < 100 ns, 0–1 mA output, INL & DNL < 1 LSB
DAC1220 12-bit res., settling time < 25 ns, 4-quadrant multiplying, INL & DNL < 1 LSB
DAC1410 14-bit resolution, settling time < 120 ns, 0–2 mA output, DNL < 1 LSB

Analog Multiplexers

MUX1B10D 2-channel mux; R_{ON} < 3 k Ω , turn-on time < 30 ns, charge injection ≈ 0.1 pC
MUX1B30 Analog switch; R_{ON} < 100 Ω , turn-on time < 30 ns, charge injection ≈ 1 pC

Voltage References

REF5V30 5 V reference; TC < 25 ppm/ $^{\circ}$ C, I_{load} < 4 mA, w/force and sense lines
REF10V10 10 V reference; TC < 25 ppm/ $^{\circ}$ C, I_{load} < 4 mA, w/force and sense lines

Sample-and-Hold Amplifier

SHATF10 For 12-bit use; acquisition time < 3 μ s, slew rate ≈ 6 V/ μ s, droop ≈ 2.5 mV/ms

Temperature Sensor

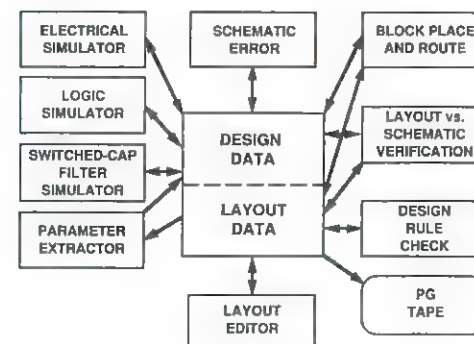
TMP10 Outputs 10 mV/K (3.00 V at 27 $^{\circ}$ C)

COMPUTER-AIDED DESIGN TOOLS

Designing a high performance mixed-signal IC is inherently more difficult than designing a gate array. The variety of analog and digital functions requires a cell-based approach. However, the use of powerful tools gives high confidence of functionality at first silicon through thorough simulation and layout verification. Complete computer-generated documentation of all schematics and analog and logic simulation waveforms permits thorough evaluation of Analog's design by your design staff before signoff for final layout and fabrication.

The overall work flow through the CAD environment follows. Key to meeting the special challenges of mixed analog/digital circuitry are the simulation and auto-layout tools, and the unification of design and layout information in a single database. Analog Devices has developed a suite of proprietary computer-aided design tools, called JANUSTM, to address these issues and to implement turn-key designs.

COMPUTER-AIDED DESIGN FLOW



The JANUS schematic editor offers numerous time-saving techniques and provides for specification of such data as wire widths, routing layers and routing priorities. It automatically generates a net list used by subsequent tools.

Analog uses several simulators, including electrical, logic and behavioral types. ADICE, a proprietary enhanced version of the SPICE electrical simulator, gives precision simulation of critical analog sections. It uses Newton-Raphson methods to iteratively solve non-linear time-dependent simultaneous differential equations. It is efficient for circuits up to about 250 active devices and is used for the frequency domain or transient analysis of analog cells such as op amps, or sensitive digital cells such as dynamic RAM.

Event-driven simulators handle larger circuits, with thousands of devices, and are typically used to simulate logic. The JANUS mixed-signal simulator combines an event-driven simulator with Newton-Raphson methods. It dynamically partitions the circuit to apply the faster event-driven techniques where possible, and the matrix methods where necessary. It also dynamically sizes the matrix and time steps to speed simulation further. The simulator can operate at the transistor level or use behavioral models, or both at the same time, allowing trade-offs between accuracy and speed.

For layout, the challenge is to increase automation while accommodating the layout sensitivity of analog circuitry. Device generators exist for the full range of active and passive devices available in the technology to automatically create a physical representation of the circuit schematic. This layout may be optimized through conventional interactive polygon-pushing.

The JANUS routing editor is driven by the connectivity of the schematics, but allows great freedom to manually control the routing of critical analog signal paths or power/ground lines while autorouting noncritical nets and spacing the layout to achieve automatic enforcement of layout rules. The JANUS routing editor uses up to three interconnect levels, and will automatically expand and compact placement as necessary to achieve 100% routing.

Finally, industry-standard layout verification tools assure conformance of the layout to both the schematic and design rules to give high confidence of functionality in first silicon. The CAD tool suite communicates via industry-standard stream formats to external databases and pattern generators.

TEST AND TRIM

Analog Devices has over 20 years of experience in testing complex circuits and manufactures commercial test systems for precision linear ICs. In each fabrication facility, a computer network integrates Analog Devices, H-P, Teradyne and LTX test equipment. The design, wafer probe and test areas share data on the network for statistical analysis and device modeling.

All Analog Devices ASICs are tested at the wafer level, and most are laser-wafer trimmed to achieve high accuracy. Untrimmed thin-film resistors match within 1% to 0.1%, depending on area. Trimmed resistors can match to better than 0.01%. Wafers may be laser drift trimmed with a hot-chuck probe to minimize the effects of temperature on accuracy.

After packaging, all parts are tested to assure that they meet guaranteed specifications. Environmental handlers can verify parts at multiple temperatures. Burn-in is performed as specified by the customer.

PACKAGING

Analog Devices ICs are available in most modern package types, including high pin-count and surface mount varieties. ASICs may be assembled in any of Analog Devices' standard packages, listed below. This list is constantly expanded and other packages may be used if they are suitable for high performance applications.

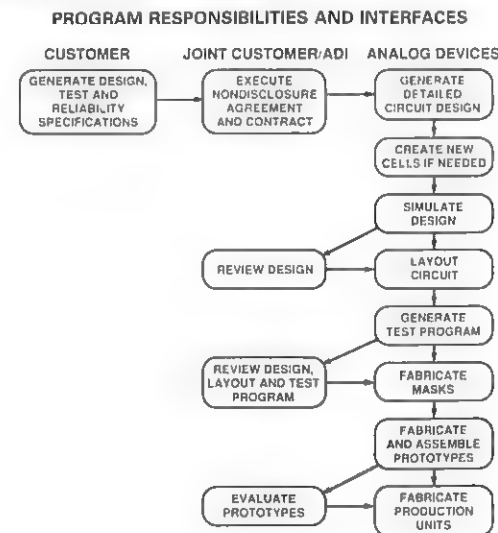
Available Packages

Pin Grid Array (PGA): 68 to 144 pins
Ceramic J Leaded Chip Carrier (CJLCC): 44 to 68 pins
Plastic Quad Flat Pack (PQFP): 44 to 132 pins
Plastic Leaded Chip Carrier (PLCC): 20 to 68 pins
Plastic Dual Inline Package (DIP): 14 to 64 pins
Side-Brazed DIP: 14 to 64 pins
Frit-Seal DIP (Cerdip): 14 to 40 pins
Small Outline (SO): 14 to 28 pins
Ceramic Quad Flat Pack (CQFP): 80 to 104 leads

PROGRAM RESPONSIBILITIES AND INTERFACES

The following figure shows the major phases in developing an ASIC and responsibilities during each phase. The overall development time depends on the complexity of the circuit and on how custom the design is.

Your Analog Devices Sales Engineer is your first interface for ASIC development. Your local sales office can provide further information on Analog Devices' custom/semicustom capabilities.



JANUS is a trademark of Analog Devices, Inc.

Power Supplies

Modular AC/DC Power Supplies

GENERAL DESCRIPTION

Analog Devices offers a broad line of modular ac/dc power supplies that provide both OEMs and designers a reliable, easy to use, low-cost solution to their power requirements. Models are available in PC mountable and chassis mountable designs with 5 volt to 15 volt (single, dual, triple) outputs and current ratings from

25 mA to 5 amps. Since these modular supplies are fully encapsulated, no trimming or external component selection is necessary; simply mount the unit, connect power and output leads, and you're on the air! Most Analog Devices' power supplies are available from stock in both large and small quantities with substantial discounts being applied to large quantity orders.

SPECIFICATIONS – Typical @ +25°C and 115 V ac 60 Hz unless otherwise noted*

		Type	Model	Output Voltage Volts	Output Current mA	Line Reg. max %	Load Reg. max %	Output Voltage Error max	Ripple & Noise mV rms max	Dimensions Inches
PC Board Mounted	Dual Output		904	±15	±50	0.02	0.02	±200 mV –0 mV	0.5	3.5×2.5×0.875
			902	±15	±100	0.02	0.02	+300 mV –0 mV	0.5	3.5×2.5×1.25
			902-2	±15	±100	0.02	0.02	+300 mV –0 mV	0.5	3.5×2.5×0.875
			920	±15	±200	0.02	0.02	+300 mV –0 mV	0.5	3.5×2.5×1.25
			925	±15	±350	0.02	0.02	±1%	0.5	3.5×2.5×1.62
			921	±12	±240	0.02	0.02	+300 mV –0 mV	0.5	3.5×2.5×1.25
	Single Output		905	5	1000	0.02	0.05	±1%	1	3.5×2.5×1.25
			922	5	2000	0.02	0.05	±1%	1	3.5×2.5×1.62
			928	5	3000	0.05	0.10	±2%	5 (typ)	3.5×2.5×1.25
		Triple Output		923	±15	±100	0.02	0.02	±1%	0.5
				+5	500	0.02	0.05	±1%	0.5	
			927	±15	±150	0.02	0.02	±2%	0.5 (typ)	3.5×2.5×1.62
		+5	1000	0.02	0.10	±2%	1.0 (typ)			
Chassis Mounted	Dual Output		970	±15	±200	0.05	0.05	±2%	1	4.4×2.7×1.45
			975	±15	±500	0.05	0.05	±2%	1	4.4×2.7×2.00
	Single Output		955	5	1000	0.05	0.15	±2%	2	4.4×2.7×1.45
			976	5	3000	0.05	0.10	±2%	5 (typ)	4.75×2.7×1.45
			977	5	5000	0.05	0.10	±2%	5 (typ)	4.75×2.7×1.45
	Triple Output		974	±15	±150	0.02	0.02	±2%	0.5 (typ)	4.75×2.7×1.45
				+5	1000	0.02	0.10	±2%	1.0 (typ)	

*Consult Analog Devices Power Supplies Catalog for additional information.
Specifications subject to change without notice.

AC/DC POWER SUPPLY FEATURES

- Current Limit Short Circuit Protection
- PC Mounted and Chassis Mounted Versions
- Single (+5 V), Dual (±12 V, ±15 V), and Triple (±15 V/+5 V, ±15 V/+1 V to +15 V) Output Supplies
- Current Outputs:
 - 25 mA to 1000 mA for Dual and Triple Output Supplies
 - 250 mA to 5000 mA for Single Output Supplies
- Wide Input Voltage Range
- Low Output Ripple and Noise
- Excellent Line & Load Regulation Characteristics
- High Temperature Stability
- Free-Air Convection Cooling; No External Heat Sink Required

GENERAL SPECIFICATIONS

Power Requirements

Input Voltage Range: 105 V ac to 125 V ac
Frequency: 50 Hz to 250 Hz

Electrical Specifications

Temperature Coefficient: 0.02%/°C
Output Voltage Accuracy: ±2%, max
See Specifications Table
Breakdown Voltage: 500 V rms, min
Isolation Resistance: 50 MΩ
Short Circuit Protection: All ac/dc power supplies employ current limiting. They can withstand substantial overload including direct short. Prolonged operation should be avoided since excessive temperature rises will occur.

Environmental Requirements

Operating Temperature Range: –25°C to +71°C
Storage Temperature Range: –25°C to +85°C

GENERAL DESCRIPTION

Analog Devices' line of compact dc/dc converters offers system designers a means of supplying a reliable, easy to use, low cost solution to a variety of floating (analog and digital) power applications. These devices provide high accuracy, short circuit protected, regulated outputs with very low output noise and ripple characteristics.

Fourteen models are offered in five power levels of 1 watt, 1.8 watts, 4.5 watts, 6 watts and 12 watts. Input voltage versions include 5 volt, 12 volt, 24 volt and 28 volt with output ranges as follows: +5 volt, ± 12 volts and ± 15 volts at ± 60 mA to 1000 mA output current capability.

Most models are high efficiency (typically over 60% at full load) and feature complete 6-sided continuous shielding for EMI/RFI protection. A π -type input filter is contained, in some models, which virtually eliminates the effects of reflected input ripple current. Most Analog Devices' dc/dc converters are available from stock in both large and small quantities with substantial discounts being applied to large quantity orders.

DC/DC POWER SUPPLY FEATURES

- Inaudible (>20 kHz) Converter Switching Frequency
- Continuous, Six-Sided EMI/RFI Shielding Except on 1 Watt and 1.8 Watt Models
- Output Short Circuit Protection (Either Output to Common)
- Automatic Restart After Short Condition Removed
- Automatic Starting with Reverse Current Injected into Outputs
- Low Output Ripple and Noise
- High Temperature Stability
- Free Air Convection Cooling

No external heat sink or specification derating is required over the operating temperature range.

GENERAL SPECIFICATIONS FOR 1 W AND 1.8 W MODELS

Line Regulation – Full Range: $\pm 0.3\%$ ($\pm 1\%$ max, 949)

Load Regulation – No Load to Full Load: $\pm 0.4\%$ ($\pm 0.5\%$ max, 949)

Output Noise and Ripple: 20 mV p-p, with 15 μ F tantalum capacitor across each output (2 mV rms max, 949)

Breakdown Voltage: 300 V dc min (500 V dc min, 949)

Input Filter Type: π

Operating Temperature Range: -25°C to $+71^{\circ}\text{C}$

Storage Temperature Range: -40°C to $+125^{\circ}\text{C}$ ($+100^{\circ}\text{C}$, 949)

Fusing: If input fusing is desired, we recommend the use of a slow blow type fuse that is rated at 150%–200% of the dc/dc converter's full load input current.

Modular DC/DC Converters

GENERAL SPECIFICATIONS FOR 4.5 W, 6 W AND 12 W MODELS

Line Regulation – Full Range: $\pm 0.07\%$ max ($\pm 0.02\%$ max, 951, 960 Series) ($\pm 0.1\%$ max, 943)

Load Regulation – No Load to Full Load: $\pm 0.07\%$ max ($\pm 0.02\%$ max, 951, 960 Series) ($\pm 0.1\%$ max, 943)

Output Noise and Ripple: 1 mV rms max

Breakdown Voltage: 500 V dc min

Input Filter Type: π

Operating Temperature Range: -25°C to $+71^{\circ}\text{C}$

Storage Temperature Range: -40°C to $+125^{\circ}\text{C}$

Fusing: If input fusing is desired, we recommend the use of a slow blow type fuse that is rated at 150%–200% of the dc/dc converter's full load input current.

SPECIFICATIONS – Typical @ $+25^{\circ}\text{C}$ at nominal input voltage unless otherwise noted*

Model	Output Voltage Volts	Output Current mA	Input Voltage Volts	Input Voltage Range Volts	Input Current Full Load	Output Voltage Error max	Temperature Coefficient $^{\circ}\text{C}$ max	Efficiency Full Load min	Dimensions Inches
943	5	1000	5	4.75/5.25	1.52A	$\pm 1\%$	$\pm 0.02\%$	62%	2.0 \times 2.0 \times 0.38
958	5	100	5	4.5/5.5	200 mA	$\pm 5\%$	$\pm 0.01\%$ (typ)	50%	1.25 \times 0.8 \times 0.4
941	± 12	± 150	5	4.75/5.25	1.17A	$\pm 1\%$	$\pm 0.01\%$	58%	2.0 \times 2.0 \times 0.38
960	± 12	± 40	5	4.5/5.5	384 mA	$\pm 5\%$	$\pm 0.01\%$ (typ)	50%	1.25 \times 0.8 \times 0.4
962	± 15	± 33	5	4.5/5.5	396 mA	$\pm 5\%$	$\pm 0.01\%$ (typ)	50%	1.25 \times 0.8 \times 0.4
964	± 15	± 33	12	10.8/13.2	165 mA	$\pm 5\%$	$\pm 0.01\%$ (typ)	50%	1.25 \times 0.8 \times 0.4
965	± 15	± 190	5	4.65/5.5	1.7 A	$\pm 1\%$	$\pm 0.005\%$ (typ)	62% (typ)	2.0 \times 2.0 \times 0.38
966	± 15	± 190	12	11.2/13.2	710 mA	$\pm 1\%$	$\pm 0.005\%$ (typ)	62% (typ)	2.0 \times 2.0 \times 0.38
967	± 15	± 190	24	22.3/26.4	350 mA	$\pm 1\%$	$\pm 0.005\%$ (typ)	62% (typ)	2.0 \times 2.0 \times 0.38
949	± 15	$\pm 60^{**}$	5	4.65/5.5	0.6 A	$\pm 2\%$	$\pm 0.03\%$	58%	2.0 \times 1.0 \times 0.375
940	± 15	± 150	5	4.75/5.25	1.35 A	$\pm 1\%$	$\pm 0.01\%$	62%	2.0 \times 2.0 \times 0.38
953	± 15	± 150	12	11/13	0.6 A	$\pm 0.5\%$	$\pm 0.01\%$	62%	2.0 \times 2.0 \times 0.38
945	± 15	± 150	28	23/31	250 mA	$\pm 0.5\%$	$\pm 0.01\%$	61%	2.0 \times 2.0 \times 0.38

NOTES

¹Models 940 and 941 will deliver up to 120 mA output current (and Model 943 will deliver up to 600 mA) over an input voltage range of 4.65 V dc and 5.5 V dc.

*Consult Analog Devices Power Supplies Catalog for additional information.

**Single-ended or unbalanced operation is permissible such that total output current load does not exceed a total of 120 mA.

Specifications subject to change without notice.

LTS-2020 Component Test Systems

THE LTS CONCEPT

The LTS-2020 is a versatile component test system which tests a multitude of components to the manufacturer's specifications (linear, digital, data conversion, and discrete devices). The system offers such features as RS-232 ports for networking, IEEE for compatibility with handlers and probers, dual disk drives for mass storage of data, automatic self-calibration, and a full statistical analysis software package.

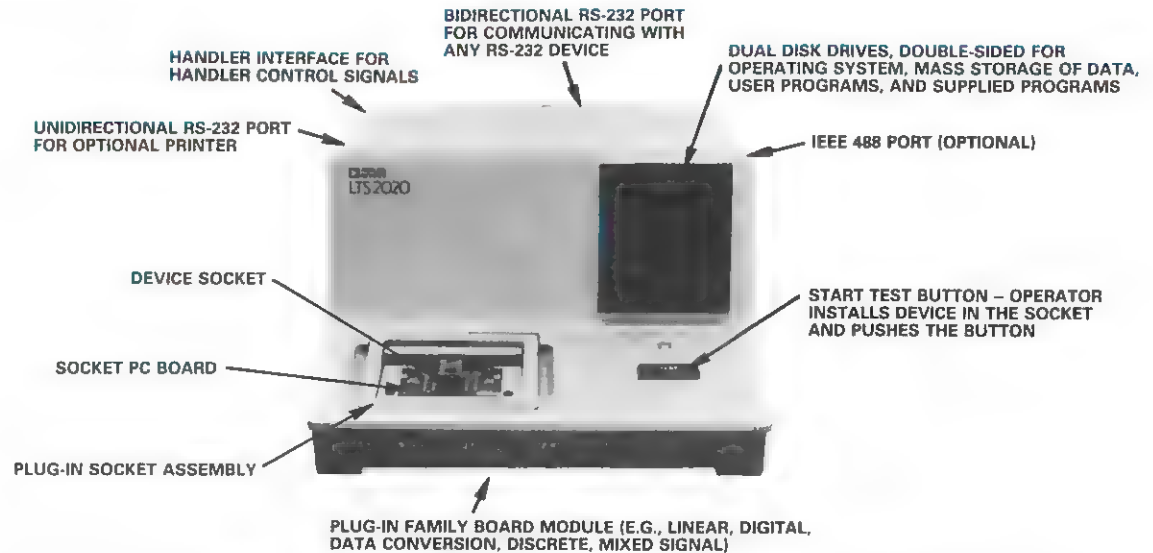
The LTS-2020 provides several data output formats – datalog, yield analysis, and statistical analysis. The console provides the primary measurement and control functions to test a specific class of devices. The socket assembly is the mechanical and electronic interface for the family board and the DUT board. The DUT board plugs directly into the socket assembly and contains the circuitry and socket, specific to the actual device under test.

Analog Devices' component test systems are the first benchtop testers that are programmable in BASIC and fill-in-the-blanks CREATE. CREATE is menu-driven software which prompts the user for data sheet limits and conditions, then builds a completed test program for the specified device. Turnkey program libraries are available for each of the device families.

Far more than just comprehensive production testers, these test systems can handle complex engineering analysis and incoming inspection. They are the first systems that can provide all the capabilities of today's large centralized test systems at a price that is approximately one-third the cost. The LTS-2020 not only provides the flexibility of distributed or decentralized testing, it allows for cost effective multiple system purchases. They increase overall test reliability since the threat of a single big failure is eliminated in a distributed testing environment.

MIXED-SIGNAL TEST CAPABILITY

The LTS-2800 Mixed-Signal Family Board and LTS-0680 Test Head perform a wide variety of ac and dc parametric tests on devices such as complex hybrids,



octal DACs, ASICs, converters, and pulse width modulators. The family board supplies the dc pin drivers, the dc force and measure system, a V_{CC} buffer, an rms-to-dc conversion circuit, voltage and current sources, and a 24×5 switching matrix. With its 24 programmable pin drivers, the system can provide high and low digital voltages, a three-state (high impedance) output mode, and accurate voltages and currents (V/I source).

The family board incorporates a series of 12-bit calibrated sources, used for programming V_{IL} and V_{IH} voltage levels at the digital inputs of the device under test. A threshold source for programming voltage levels on a comparator is used to detect digital output voltage levels accurately. For forcing and measuring currents, a V/I source provides and measures 10 μA to 400 mA and voltages to $\pm 20 V$.

A switching matrix provides system flexibility by allowing any one of several capabilities to be switched to any of the pin drivers. These include the measure system, V/I source, V_{IH} and V_{IL} sources, the rms-to-dc circuit, and BNC input and output connectors for

interconnection with external instruments using the IEEE-488 bus.

The LTS-0680 Mixed-Signal Test Head contains a precise and versatile time measure unit which provides accurate ac measurement of propagation delays, slew rates, pulse widths, and rise and fall times. It also incorporates a 16-bit user data bus, 16-bit relay driver bus, four 12-bit programmable sources, and a user's expansion board. A square wave source to the DUT provides up to ± 10 volt signals, from 1.22 kHz to 2.5 MHz.

LINEAR DEVICE TEST CAPABILITY

The LTS-2101 Operational Amplifier Family Board tests today's very demanding high precision op amps, comparators, and regulators. This board houses the test loop used in testing op amps and comparators and the pulse load circuitry used in developing the high currents needed for voltage regulator testing.

For testing devices under 100 μV , the LTS-2101 offers a tight offset spec of $\pm(0.25\% + 5 \mu\text{V})$. Use of low thermal Emf relays and a test loop gain of 10,045 ensures superior low level V_{OS} measurement performance for optimum repeatability of low level signals.

Testing of low current devices is achieved with the LTS-0614 Socket Assembly which is designed to test bias and offset currents with an accuracy of $\pm(5\% + 25 \text{ fA})$ for any FET amplifier, including quad devices. Program libraries containing prewritten test programs for many standard op amps, comparators and regulators are available on disk.

ANALOG-TO-DIGITAL TEST CAPABILITY

The LTS-2200 ADC Family Board provides the test circuitry required for testing monolithic, hybrid, or modular ADCs. An on-board 16-bit microprocessor with 8K bytes of memory acts as a slave for the system console and executes preprogrammed test routines such as linearity, all codes existence, transition noise measurements, and conversion time measurements at high speed. Absolute accuracy can be measured within 200 μV . Linearity, differential nonlinearity, offset, gain, and PSSR are tested to ± 0.05 DUT LSB $+200 \mu\text{V}$. Turnkey test packages are available for many of the standard ADCs currently in use.

DIGITAL-TO-ANALOG TEST CAPABILITY

The LTS-2302 DAC Family Board utilizes advanced state-of-the-art test techniques to provide comprehensive test capabilities for a wide variety of D/A converters. It will test both voltage and current output DACs, DACs with and without buffer registers, and serial or parallel input DACs to 16-bit accuracy.

High repeatability on low level signals is achieved because of the grounding scheme on the LTS-2302. The incorporation of high level components in the V/I circuits ensures true accuracy. In addition, the methodology for measuring low bit currents allows appropriate testing of this parameter on CMOS DACs.

Output leakage current on the LTS-2302 is measured with the bit drivers to the DAC set to logic 0. Current is measured using the I to V converter. A 1 M Ω resistor within the I to V circuitry ensures sensitivity, thereby measuring current down to $\pm 1 \mu\text{A}$ full scale.

DIGITAL DEVICE TEST CAPABILITY

The LTS-2510 Digital Device Family Board provides 24-pin driver/detectors and a precision, four quadrant V/I source for testing SSI/MSI TTL and CMOS digital devices. This board contains four programmable device supplies and switching circuitry necessary for performing accurate parametric measurements on all device pins.

Together with the LTS-0655 remote ac test fixture, dynamic parametric testing of 24-pin SSI/MSI TTL digital devices can be achieved. Accuracies are achieved down to $\pm 4\% + 1.5 \text{ ns}$ at a resolution of 500 ps. Dynamic parameters tested are propagation delay, setup, and hold times.

DISCRETE DEVICE TEST CAPABILITY

The LTS-2600 Transistor Family Board tests bipolar transistors, JFETs, diodes, and optocouplers. An on-board 16-bit microprocessor with 4K bytes of memory acts as a slave for the LTS system and coordinates the timing and pulse width control of the stimulus and measurement signals. In addition, the microprocessor monitors the interlock circuitry to insure safe handling of high power test signals.

MOSFET software packages support the testing of N and P channel enhancement mode and N channel depletion mode devices. Tests which may be performed on MOSFET devices include I_{dss} , I_{gss} , I_{gssf} , I_{gssr} , I_d (off), I_d (on), $B V_{dss}$, $B V_{gss}$, $B V_{gssf}$, $B V_{gssr}$, V_{ds} (on), V_{gs} (th), V_{gsoff} , V_{sd} , R_{ds} (on), and G_{sf} .

The Smartpower Test Fixture will support fast, accurate testing of devices such as Darlington Arrays, Differential Line Drivers/Receivers, and Transceivers/Repeaters. It contains a matrix board which facilitates the muxing of High Voltage/High Current V/Is, a nonometer, diffamp, 16-bit measure system, and mecca ground reference to any one of eight matrix points at the DUT site and eight dc pin drivers programmable to any one of four modes – V/I, V_{IH} , V_{IL} or Tristate. This configuration allows true digital dc parametric testing of the front-end of smartpower devices while providing the high voltage and high current capability to test the discrete output stage.

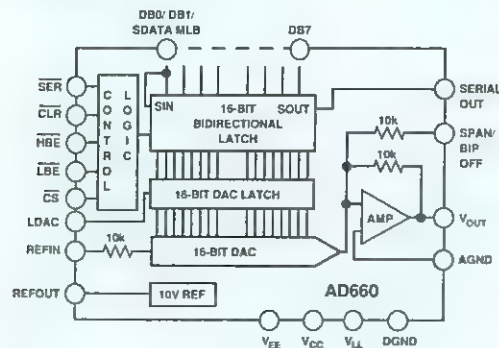
ANALOG SWITCH TEST CAPABILITY

The LTS-2700 Analog Switch Family Board adds switch and multiplexer testing capability to the LTS-2020. This test capability, with CREATE software, allows datalogged device testing at the incoming inspection and semiconductor manufacturing levels and includes software power for use in component evaluation applications.

The LTS-2700 tests on and off drain to source leakage currents with an accuracy of 250 pA while forcing differential voltages up to 50 V ($\pm 25 \text{ V}$ from GND). Other tests performed are drain to source on resistance, greatest change in drain-source on resistance between channels, digital input current and supply current.

Twenty high integrity analog lines are provided – four to be used as drain connections and sixteen for source connections. Also provided are eight programmable digital drivers, four digital control bits, six variable power supplies, and one fixed +5 V supply. These combinations of sources provide testing of devices such as 4-channel switches, 16 to 1 multiplexers, and other combinations of switches and multiplexers.

16-Bit Monolithic Byte/Serial DACPORT™

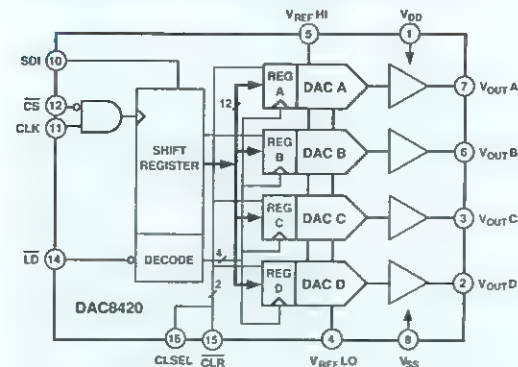


AD660

FEATURES

- Complete 16-Bit DAC Function
- On-Chip Output Amplifier
- High Stability Buried Zener Reference
- Microprocessor Compatible
- 8-Bit Byte and Serial Interface Capability
- Fast 40 ns Write Pulse
- MSB or LSB First Programmable Serial Input
- Asynchronous Clear Pin
- Serial Output Pin Allows Daisy Chaining of DACs
- Both AC and DC Specified and Tested
- High DC Accuracy
 - ± 1 LSB Relative Accuracy
 - 15-Bit Monotonic over Temp
- High AC Performance
 - 0.009% 0 dB THD+N
 - 15 nV-s Glitch Impulse
- Unipolar 0 to +10 V or Bipolar -10 V to +10 V Output
- Power Supplies: +5 V, ± 15 V (± 12 V Possible)
- 24-Pin "Skinny" DIP Package

Serial, Quad Voltage Output BiCMOS 12-Bit DAC



DAC-8420

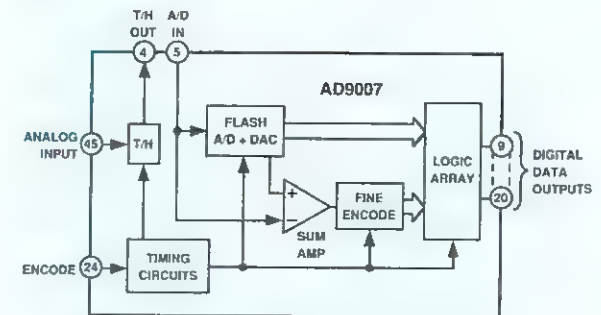
FEATURES

- +5 Volt to ± 15 Volt Operation
- Unipolar or Bipolar Operation
- Buffered Voltage Output
- Reset to Zero or Center Scale
- Serial Digital Interface
- Available in 16-Pin DIP and 18-Pin SOIC

APPLICATIONS

- Digitally Controlled Calibration
- Servo Controls
- Process Control Equipment

12-Bit, 10 MSPS A/D Converter



AD9007

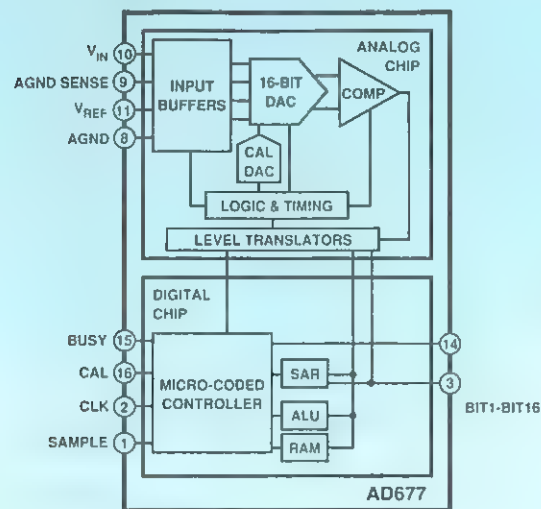
FEATURES

- Complete 12-Bit A/D Converter
- Includes Track and Hold, Reference, and Timing
- Bipolar Analog Input (± 1.25 V)
- Up to 10 MSPS Sampling Rate
- Dual Supply: +5 V, -5.2 V Only
- Tri-State Outputs

APPLICATIONS

- Radar
- Digital Receivers
- Electro-Optics
- Medical Scanners
- Signal Intelligence
- Spectrum Analyzers

16-Bit, 100 kSPS Autocalibrating Sampling ADC

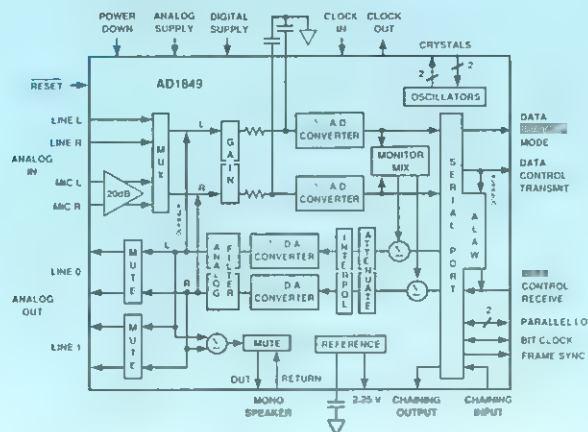


AD677

FEATURES

- Spec'd for AC and DC
- 16-Pin Narrow DIP (Plastic and Ceramic)
- Serial Output
- Commercial, Industrial, MIL Temp
- \$35 in 100s
- Samples December '91
- Intro February '92

16-Bit SOUNDPORT™ Stereo Coded

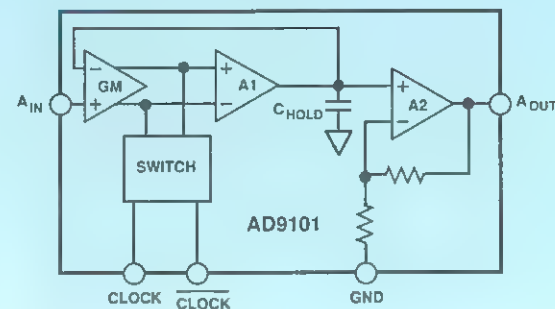


AD1849

FEATURES

- Single-Chip Integrated $\Sigma\Delta$ Digital Audio Stereo Codec
- Multiple Channels of Stereo Input and Output
- Programmable Gain and Attenuation
- On-Chip Signal Filters
- Analog Input Antialias
- Digital Interpolation
- Analog Output Low Pass
- Sample Rates from 8 kHz to 48 kHz
- Operation from +5 V Supplies
- 44-Lead PLCC Package
- Serial Interface Compatible with ADSP-21XX Fixed-Point DSPs
- Pin Compatible with CS4215

100 MSPS Sampling Amplifier



AD9101

FEATURES

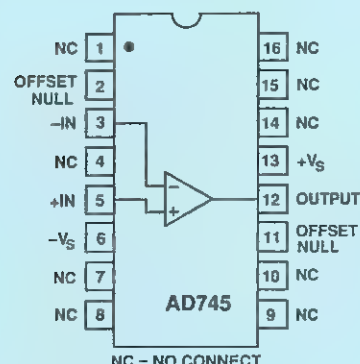
- 250 MHz Tracking Bandwidth
- >100 MHz Sampling Rate
- Excellent Hold Mode Distortion
- 52 dB @ 100 MSPS (100 MHz V_{IN})
- 7 ns Acquisition Time to 0.1%
- <1 ps Aperture Jitter
- 55 dB Feedthrough Rejection @ 100 MHz

APPLICATIONS

- Direct IF Sampling
- Digital Sampling Oscilloscopes
- Peak Detectors
- Radar/EW/ECM
- Spectrum Analysis

DACPORT and SOUNDPORT are trademarks of Analog Devices, Inc.

Ultralow Noise, High Speed, BiFET Op Amp



AD745

FEATURES

ULTRALOW NOISE PERFORMANCE

2.9 nV/√Hz at 10 kHz

0.38 μV p-p, 0.1 Hz to 10 Hz

6.9 fA/√Hz Current Noise at 1 kHz

EXCELLENT AC PERFORMANCE

12.5 V/μs Slew Rate

20 MHz Gain Bandwidth Product

THD = 0.0002% @ 1 kHz

Internally Compensated for Gains of +5 (or -4) or Greater

EXCELLENT DC PERFORMANCE

0.5 mV max Offset Voltage

250 pA max Input Bias Current

2000 V/mV min Open Loop Gain

Available in Tape and Reel in Accordance with EIA-481A Standard

APPLICATIONS

Sonar

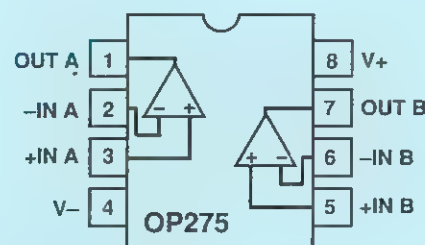
Photodiode and IR Detector Amplifiers

Accelerometers

Low Noise Preamplifiers

High Performance Audio

Dual, Bipolar/JFET, Audio Operational Amplifier



OP-275

FEATURES

"Sounds Good"

Low Noise: 6 nV/√Hz

Low Distortion: 0.005%

High Slew Rate: 25 V/μs

Wide Bandwidth: 9 MHz

Low Supply Current: 2 mA/Amplifier

Low Offset Voltage: 1 mV

Low Offset Current: 2 nA

Unity-Gain Stable

APPLICATIONS

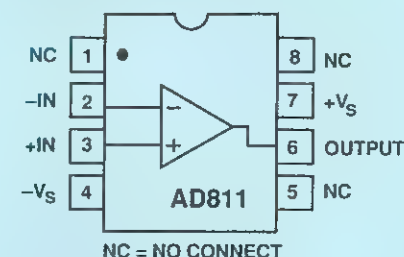
High Performance Audio

Active Filters

Fast Amplifiers

Integrators

High Performance Video Op Amp



AD811

FEATURES

High Speed

140 MHz Bandwidth (3 dB, G = +1)

120 MHz Bandwidth (3 dB, G = +2)

35 MHz Bandwidth (0.1 dB, G = +2)

2500 V/μs Slew Rate

25 ns Settling Time to 0.1% (for a 2 V Step)

65 ns Settling Time to 0.01% (for a 10 V Step)

Excellent Video Performance ($R_L = 150 \Omega$)

0.01% Differential Gain, 0.01° Differential Phase

Voltage Noise of 1.9 nV/√Hz

Low Distortion: THD = -74 dB @ 10 MHz

Excellent DC Precision

3 mV max Input Offset Voltage

Flexible Operation

Specified for ±5 V and ±15 V Operation

±2.3 V Output Swing into a 75 Ω Load ($V_S = \pm 5 V$)

APPLICATIONS

Video Crosspoint Switchers, Multimedia Broadcast Systems

HDTV Compatible Systems

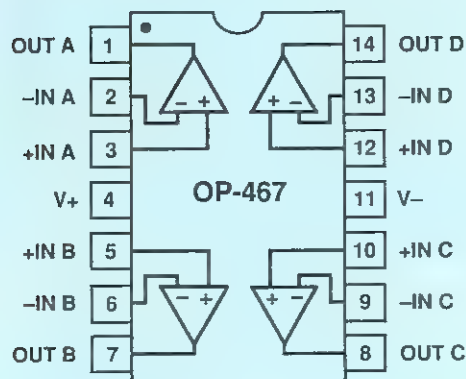
Video Line Drivers, Distribution Amplifiers

ADC/DAC Buffers

DC Restoration Circuits

Medical-Ultrasound, PET, Gamma & Counter Applications

Quad Precision, High Speed Operational Amplifier



OP-467

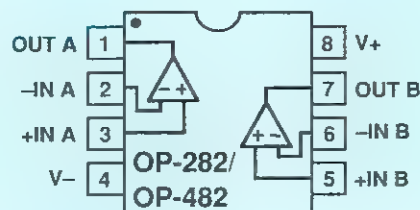
FEATURES

High Slew Rate: 170 V/ μ s
Wide Bandwidth: 30 MHz
Fast Settling Time: <170 ns to 0.01%
Low Offset Voltage: <500 μ V
Unity-Gain Stable
Low Voltage Operation ± 5 to ± 15
Drives Capacitive Loads

APPLICATIONS

High Speed Image Display Drivers
Active Filters
Fast Amplifiers
Integrators
Photo Diode Preamps

High Speed, Low Power Dual/Quad Operational Amplifier



OP-282/OP-482

FEATURES

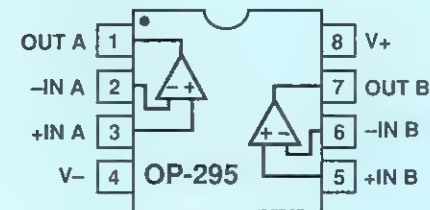
AC PERFORMANCE

Slew Rate: 10 V/ μ s Typical
7 V/ μ s Minimum

DC PERFORMANCE

Supply Current: 250 μ A max per Amplifier
Input Offset Voltage: 2 mV max (OP-282),
3 mV max (OP-482)
Input Bias Current: 100 pA max
Open-Loop Gain: 25 V/mv min
SO-8 (OP-282) and SO-14 (OP-482) Packages
Also Available in Cerdip and 20-Contact LCC

Rail-to-Rail Operational Amplifier



OP-295

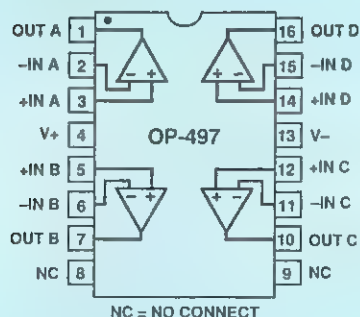
FEATURES

Rail-to-Rail Output Swing
Single-Supply Operation, +3 to 36 V
Low Offset Voltage: 500 μ V
Gain Bandwidth Product: 100 kHz
High Open-Loop Gain: 1000 V/mV
Unity-Gain Stable

APPLICATIONS

Battery Operated Instrumentation
Servo Amplifiers
Actuator Drives
Sensor Conditioners
Power Supply Control

Precision Picoampere Input Current Quad Operational Amplifier



OP-497

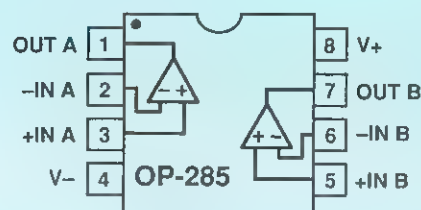
FEATURES

Low Offset Voltage: 50 μV max
 Low Offset Voltage Drift: 0.5 $\mu\text{V}/^\circ\text{C}$ max
 Very Low Bias Current
 +25°C: 100 pA max
 -55°C to +125°C: 450 pA max
 Very High Open-Loop Gain: 2000 V/mV min
 Low Supply Current (per Amplifier): 625 μA max
 Operates from ± 2 V to ± 20 V Supplies
 High Common-Mode Rejection: 120 dB min

APPLICATIONS

Strain Gage and Bridge Amplifiers
 High Stability Thermocouple Amplifiers
 Instrumentation Amplifiers
 Photo-Current Monitors
 High-Gain Linearity Amplifiers
 Long-Term Integrators/Filters
 Sample-and-Hold Amplifiers
 Peak Detectors
 Logarithmic Amplifiers
 Battery-Powered Systems

Dual Bipolar/JFET, Precision Operational Amplifier



OP-285

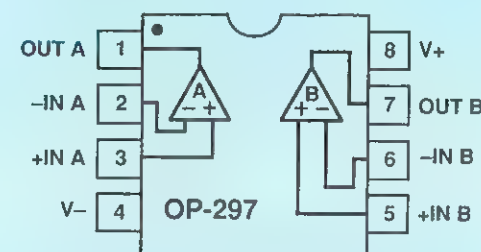
FEATURES

Low Offset Voltage: 250 μV
 Wide Bandwidth: 8 MHz
 High Slew Rate: 20 V/ μs
 Low Noise: 6 nV/ $\sqrt{\text{Hz}}$
 Low Distortion: .001%
 Low Supply Current: 2 mA/Amplifier
 Low Offset Current: 2 nA
 Unity-Gain Stable

APPLICATIONS

Active Filters
 Fast Amplifiers
 Integrator

Dual Low Bias Current Precision Operational Amplifier



OP-297

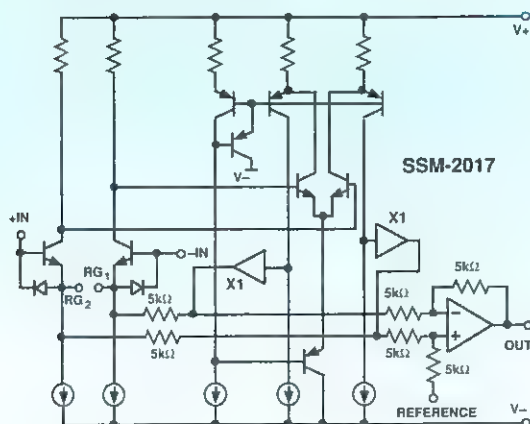
FEATURES

Precision Performance in Standard SO-8 Pinout
 Low Offset Voltage: 50 μV max
 Low Offset Voltage Drift: 0.6 $\mu\text{V}/^\circ\text{C}$ max
 Very Low Bias Current
 +25°C: 100 pA max
 -55°C to +125°C: 450 pA max
 Very High Open-Loop Gain: 2000 V/mV min
 Low Supply Current (per Amplifier): 625 μA max
 Operates from ± 2 V to ± 20 V Supplies
 High Common-Mode Rejection: 120 dB min
 Pin Compatible to LT1013, AD706, AD708,
 OP-221, LM-158, and MC1458/1558 with
 Improved Performance

APPLICATIONS

Strain Gage and Bridge Amplifiers
 High Stability Thermocouple Amplifiers
 Instrumentation Amplifiers
 Photo-Current Monitors
 High-Gain Linearity Amplifiers
 Long-Term Integrators/Filters
 Sample-and-Hold Amplifiers
 Peak Detectors
 Logarithmic Amplifiers
 Battery-Powered Systems

Self-Contained Audio Preamplifier



SSM-2017

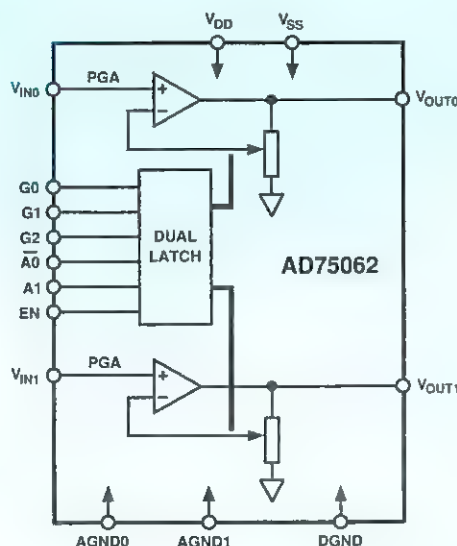
FEATURES

- Excellent Noise Performance: $950 \text{ pV}/\sqrt{\text{Hz}}$ or 1.5 dB Noise Figure
- Ultralow THD: $<0.01\%$ @ $G = 100$ over the Full Audio Band
- Wide Bandwidth: 1 MHz @ $G = 100$
- High Slew Rate: $17 \text{ V}/\mu\text{s}$ typ
- Unity Gain Stable
- True Differential Inputs
- Subaudio $1/f$ Noise Corner
- 8-Pin Mini-DIP with Only One External Component Required
- Very Low Cost
- Extended Temperature Range: -40°C to $+85^\circ\text{C}$

APPLICATIONS

- Audio Mix Consoles
- Intercom/Paging Systems
- Two-Way Radio
- Sonar
- Digital Audio Systems

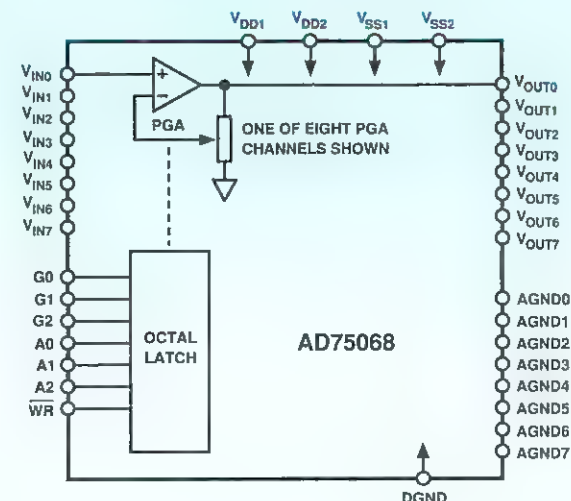
Multiple 2 MHz PGAs



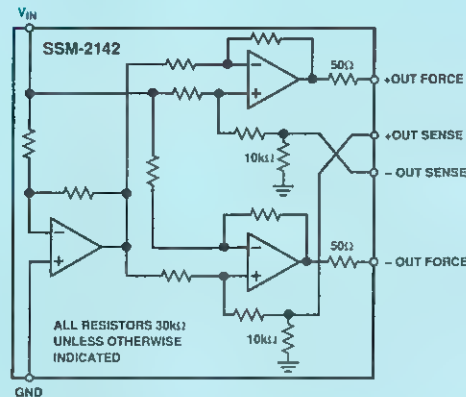
AD75062/AD75068

FEATURES

- Two or Eight Programmable Gain Amps in a Monolithic IC
 - Wideband: 2 MHz Bandwidth at All Gain Settings
 - Low Phase Shift: $< 2.5^\circ$ up to 10 kHz, $< 0.25^\circ$ up to 1 kHz
 - Independent PGA Gains of 1, 2, 4, 8, 16, 32, 64, or 128
 - Low Nonlinearity: $< 0.04\%$ at all Gains
 - Low Input Bias Current: $< 4 \text{ pA}$
 - Small Size: 16-Pin DIP or 44-Pin JLCC Package
 - Operates from $\pm 12 \text{ V}$ Supplies
- #### APPLICATIONS
- Sonar
 - Instrumentation



Balanced Line Driver



SSM-2142

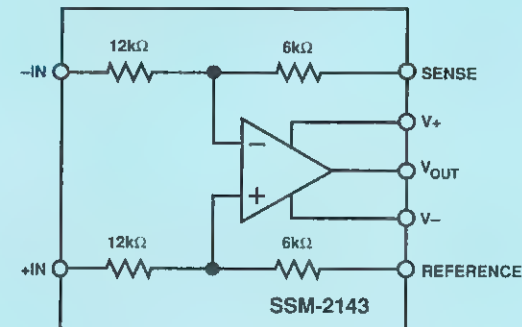
FEATURES

- Transformer-Like Balanced Output
- Drives 10 V RMS Into a 600 Ω Load
- Stable When Driving Large Capacitive Loads and Long Cables
- Low Distortion
 - 0.006% typ 20 Hz-20 kHz, 10 V RMS into 600 Ω
- High Slew Rate
 - 15 V/ μ s typ
- Low Gain Error
 - (Differential or Single-Ended); 0.7% typ
- Outputs Short-Circuit Protected
- Available In Space-Saving 8-Pin Mini-DIP Package
- Low Cost

APPLICATIONS

- Audio Mix Consoles
- Distribution Amplifiers
- Graphic and Parametric Equalizers
- Dynamic Range Processors
- Digital Effects Processors
- Telecommunications Systems
- Industrial Instrumentation
- Hi-Fi Equipment

-6 dB Differential Line Receiver

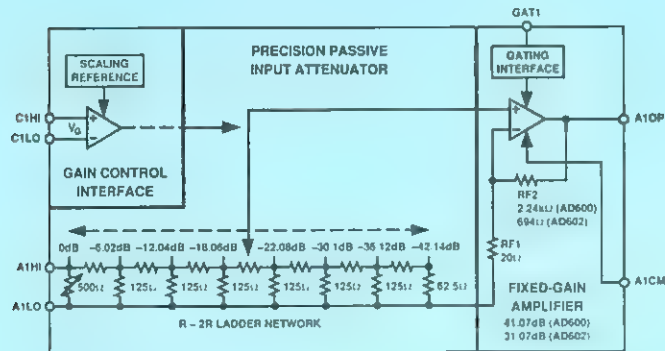


SSM-2143

FEATURES

- High Common-Mode Rejection
 - DC: 90 dB typ
 - 60 Hz: 90 dB typ
 - 20 kHz: 85 dB typ
- Ultralow THD; 0.0006% typ @ 1 kHz
- Fast Slew Rate: 10 V/ μ s typ
- Wide Bandwidth: 7 MHz typ ($G = 1/2$)
- Two Gain Levels Available: $G = 1/2$ or 2
- Low Cost

Dual Low Noise Wideband Variable Gain Amplifiers



AD600/AD602

FEATURES

Two Channels with Independent Gain Control

"Linear in dB" Gain

Two Gain Ranges-

AD600: 0 dB to +40 dB,

AD602: -10 dB to +30 dB

Accurate Absolute Gain: ± 0.5 dB

Low Input Noise: $104 \text{ nV}/\sqrt{\text{Hz}}$

Low Distortion: -60 dBc THD @ ± 1 V Output

High Bandwidth: DC to 35 MHz (-3 dB)

Stable Group Delay: ± 2 ns

Low Power: 125 mW (max) per Amplifier

Signal Gating Function for each Amplifier

Drives High Speed A/D Converters

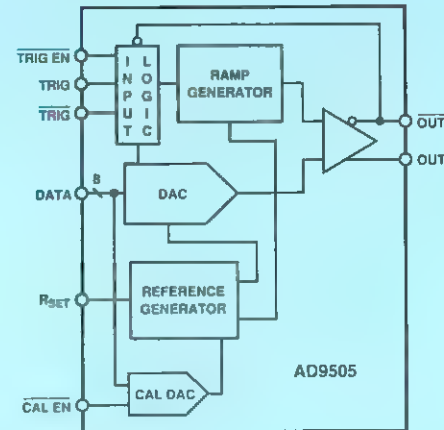
APPLICATIONS

Ultrasound and Sonar Time-Gain Control

High Performance Audio and RF AGC Systems

Signal Measurement

Digitally Programmable Pulse Edge Delay Vernier



AD9505

FEATURES

60 MHz Update Rate

± 1.5 LSB Dynamic Nonlinearity

100 MHz Update Rate

± 5 LSB Dynamic Nonlinearity

On-the-Fly Delay Update

8-Bit Resolution

2.5 ns to 25 ns Full-Scale Range

10 ps Incremental Delay

On-Board Calibration DAC

APPLICATIONS

ATE Pattern Generator

Programmable Pulse Generator

Frequency-Agile Clock Generator

Precise Pulse Phase Delay

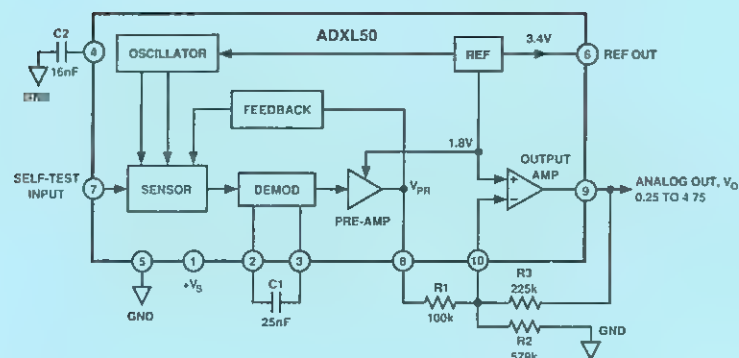
Variable Duty Cycle Clock

Laser Printers

High Speed PWM

Line-to-Line Deskew

Monolithic Accelerometer with Signal Conditioning



ADXL50

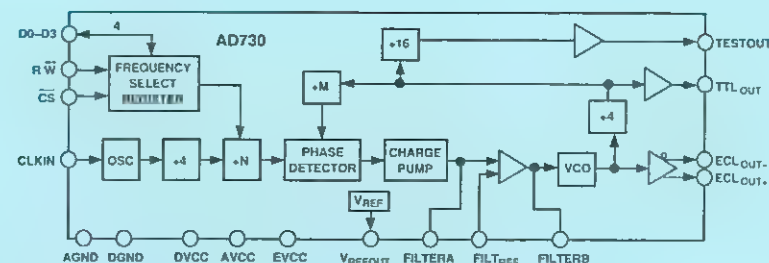
FEATURES

- Full Scale Measurement Range: ± 50 g
- Self-Test on Digital Command
- Single Supply Operation: +5 V to +24 V
- Output Range: 0.25 V to 4.75 V
- Accuracy of Span: 5% over -55°C to $+125^{\circ}\text{C}$
- Uncommitted Output Amplifier for Custom Scaling and Zero-g Level Adjustment
- Programmable Bandwidth: DC up to 1 kHz
- Additional Filtering: 2-Pole with External Passive Components
- High Shock Survival: >2000 g Unpowered

APPLICATIONS

- Crash Detection for Airbag Deployment and Seat Belt Retraction
- Vibration Analysis and Cancellation
- Measurement, Characterization and Instrumentation, e.g., Crash Dummies

Programmable Clock Generator

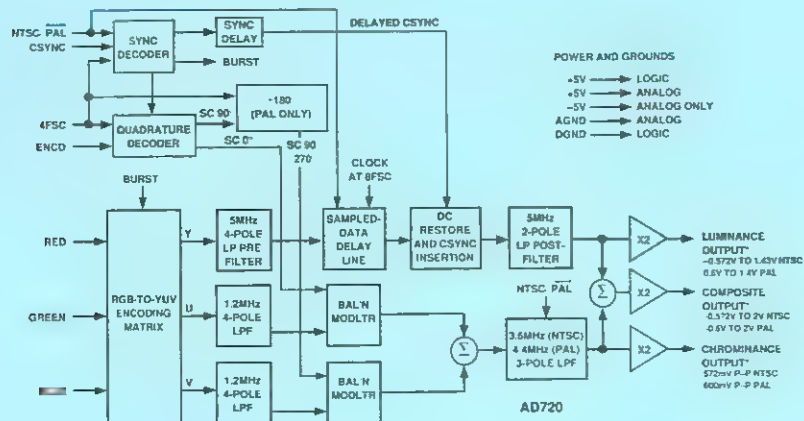


AD730

FEATURES

- 16 Selectable Frequencies
- 216 MHz max ECL Output
- 54 MHz max TTL Output
- Low Output Jitter
- Low Cost
- Mask Programmable Frequencies
- Single Reference Crystal or TTL Clock
- Standard MPU Interface
- Bt458 Compatible Reset
- +5 V Supply
- 20-Pin SOIC Packaging

RGB to NTSC Pal Encoder



AD720

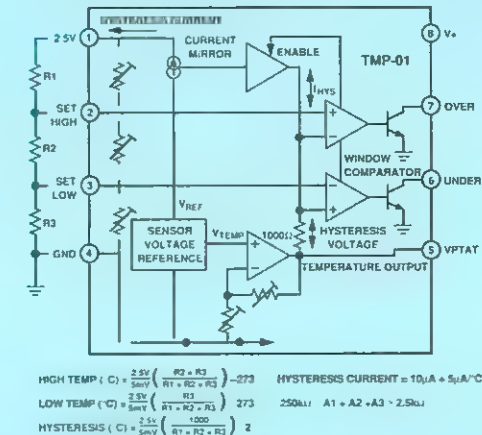
FEATURES

- Separate Chrominance, Luminance and Composite Video Outputs
- Drives 75 Ω Reverse-Terminated Loads
- No External Filters or Delay Lines Needed
- Compact 28-Pin PLCC
- Logic Selectable NTSC or Pal Encoding Modes
- Logic Selectable Power-Down Mode

APPLICATIONS

RGB TO NTSC/Pal Encoding

Low Power Programmable Temperature Controller



TMP-01

FEATURES

- 55°C to +150°C (–60°F to +300°F) Operation
- 2°C Accuracy over Temperature
- Temperature-Proportional Voltage Output
- User-Programmable Temperature Trip Points
- User-Programmable Hysteresis
- 20 mA Open-Collector Trip Point Outputs
- TTL/CMOS Compatible
- Single-Supply Operation (4.5 V to 25 V)
- Low Cost 8-Pin DIP, SO, and TO-99 Packages

APPLICATIONS

- Over/Under Temperature Sensor and Alarm
- Board Level Temperature Sensing
- Temperature Controllers
- Electronic Thermostats
- Thermal Protection
- HVAC Systems
- Industrial Process Control
- Remote Sensors

10 MIPS DSP Microcomputer

ADSP-2105

100 ns Instruction Cycle with Sustained 10 MIPS Performance

ADSP-2100 Family Extension; Code-Compatible
ADSP-2101 Pin-Compatible

1 K Words of On-Chip Program Memory RAM

512 Words of On-Chip Data Memory RAM

Memory Expandable Off-Chip for Both Program
and Data Memory

ADSP-2100 Base Architecture

Three Independent Computation Units

Two Independent Data Address Generators

Powerful Program Sequencer

One Bidirectional Synchronous Serial Port with
Companding Hardware

Programmable 16-Bit Interval Timer with
Prescaler

Programmable Wait State Generation

Automatic Boot of Internal Program Memory
from Byte-Wide External Memory, e.g., EPROM

Provisions for Multiprecision Computation and
Saturation Logic

Single-Cycle Instruction Execution

Multifunction Instructions

Three Edge or Level-Sensitive External Interrupts

On-Chip Clock Generation Circuitry

68-Lead PLCC

APPLICATIONS

Optimized for DSP Algorithms Including

Digital Filtering

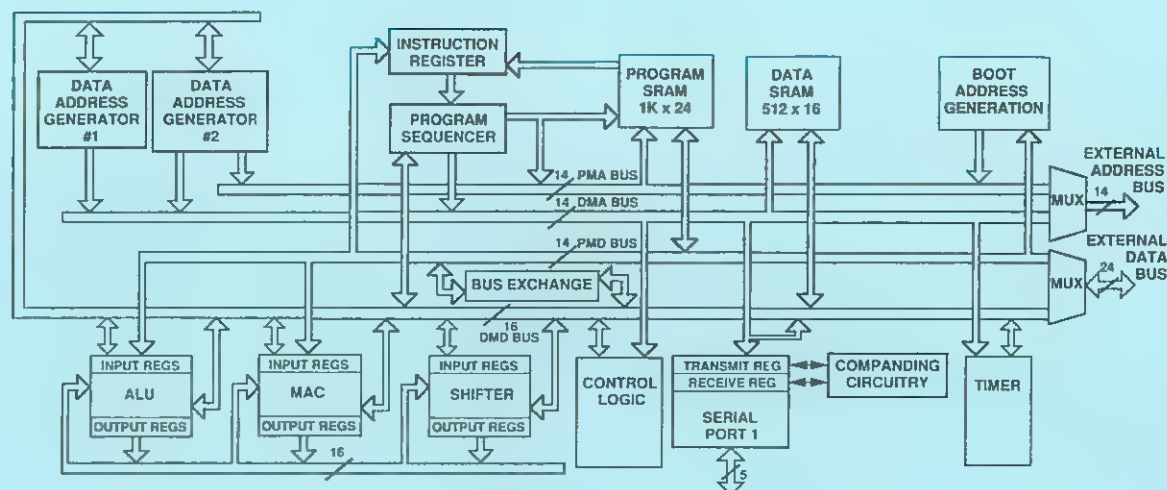
Fast Fourier Transforms

Applications Include

Image Processing

Speech Processing

Telecommunications



DSP Microcomputer with Host Interface Port

ADSP-2111

77 ns Instruction Cycle with Sustained 13 MIPS Performance

ADSP-2100 Code and Function Compatible

2 K Words of Program Memory RAM

1 K Word of Data Memory RAM

Host Interface Port: Simple Interface of 68000, 8051, ADSP-210X and Others

Separate Program and Data Buses On-Chip

Dual Purpose Program Memory for Both Instructions and Data Storage

Three Independent Computational Units: ALU, Multiplier/Accumulator and Barrel Shifter

Two Independent Data Address Generators

Powerful Program Looping

Zero Overhead Looping

Conditional Arithmetic Instruction Execution

Two Double-Buffered Serial Ports with Companding Hardware and Automatic Data Buffering

Input and Output Flags

Programmable Interval Timer

Programmable Wait State Generation

Automatic Booting from Byte-Wide External Memory, e.g., EPROM

Automatic Booting from Host Port

Provisions for Multiprecision Computation and Saturation Logic

Single-Cycle Instruction Execution

Multifunction Instructions

Three Edge or Level-Sensitive External Interrupts

80 mW Maximum Power Dissipation in Standby Mode

100-Pin PGA and 100-Lead PQFP

APPLICATIONS

Optimized for DSP Algorithms Including

Digital Filtering

Fast Fourier Transforms

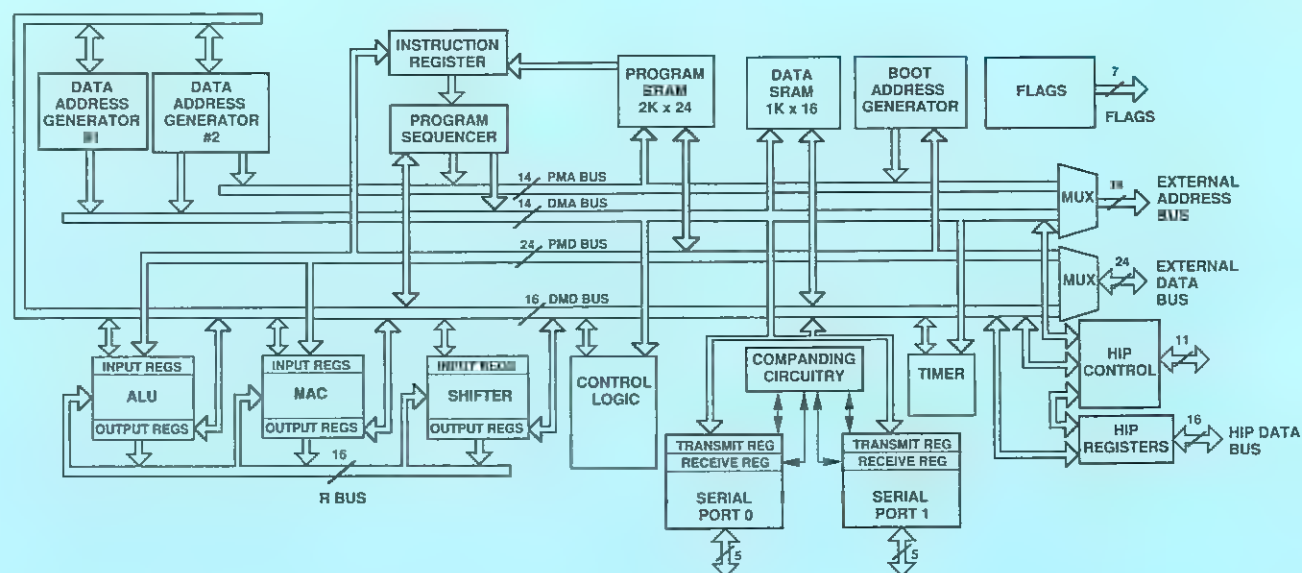
Applications Include

Image Processing

Radar, Sonar

Speech Processing

Telecommunications



DSP Mixed-Signal Processor

ADSP-21msp50

ADSP-2100 Family Extension; Code Compatible
75 ns Instruction Cycles with Sustained
13.3 MIPS Performance

2 K Words of On-Chip Program Memory SRAM

1 K Word of On-Chip Data Memory SRAM

Memory Expandable Off-Chip for Both Program
and Data Memory

ADSP-2100 Base Architecture

Three Independent Computational Units

Two Independent Data Address Generators

Powerful Program Sequencer

Linear Codec with 8 kHz Sampling Offering 65 dB
SNR and THD

Dynamically Reconfigurable 8/16-Bit Host

Interface Port; Direct Interface to 68000, 8051,
ADSP-210X and Others

Two Bidirectional Synchronous Serial Ports

16-Bit Timer with Prescaler

Boot of Internal Program Memory via Data Bus
or Host Interface Port

Programmable Wait State Generator

Three Flag-Out Pins for System Control

Power Down Modes for Low Power Applications

On-Chip Clock Generation Circuitry

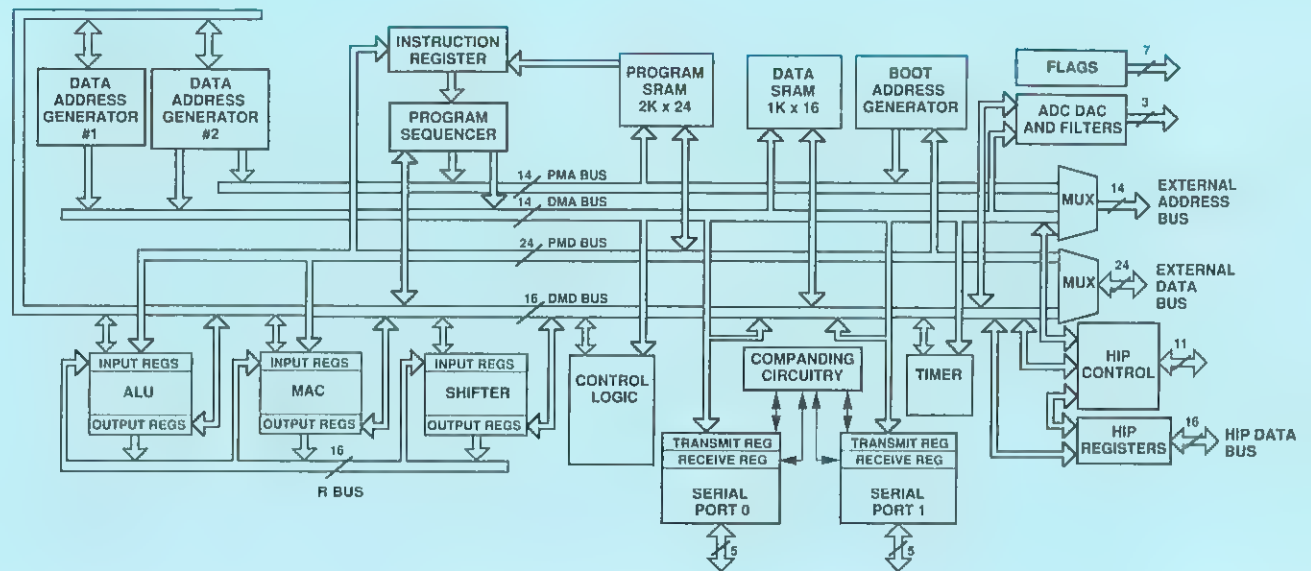
132-Pin PQFP and 80-Pin JEDEC Metric

APPLICATIONS

Mixed-Signal Processing Including

Telecommunications

Speech Processing



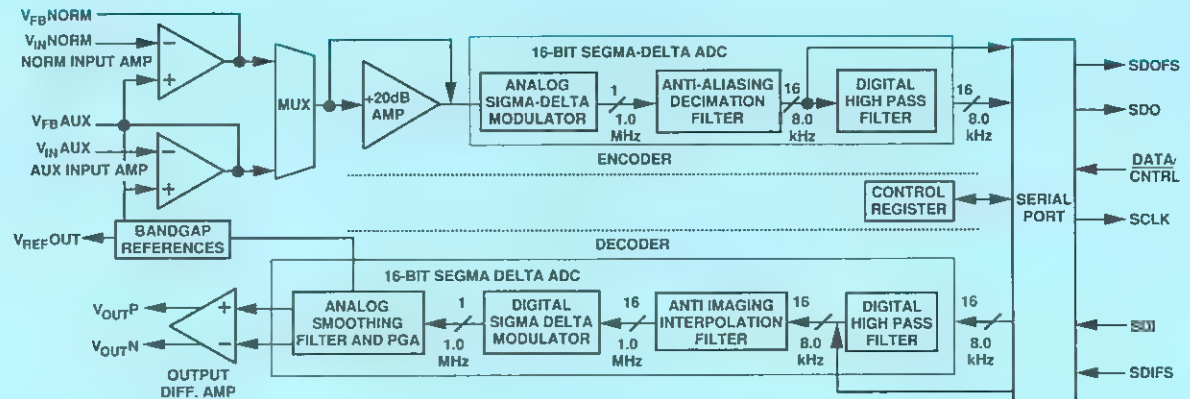
DSP Mixed-Signal Peripheral Linear Codec

AD28msp02

Complete Linear Coded Codec
16-Bit Sigma Delta ADC
16-Bit Sigma Delta DAC
On-Chip Antialiasing and Antiimaging Filters
On-Chip Voltage Reference
8 kHz Sampling Frequency
Twos Complement Coding
65 dB SNR and THD
Programmable Gain on DAC and ADC
DSP Compatible Serial Port
24-Pin (0.3 inch) DIP/SOIC
Single 5 V Power Supply

APPLICATIONS

Mixed-Signal Processing Including
Telecommunications
Digital Mobile Phones
Computers
Speech Processing



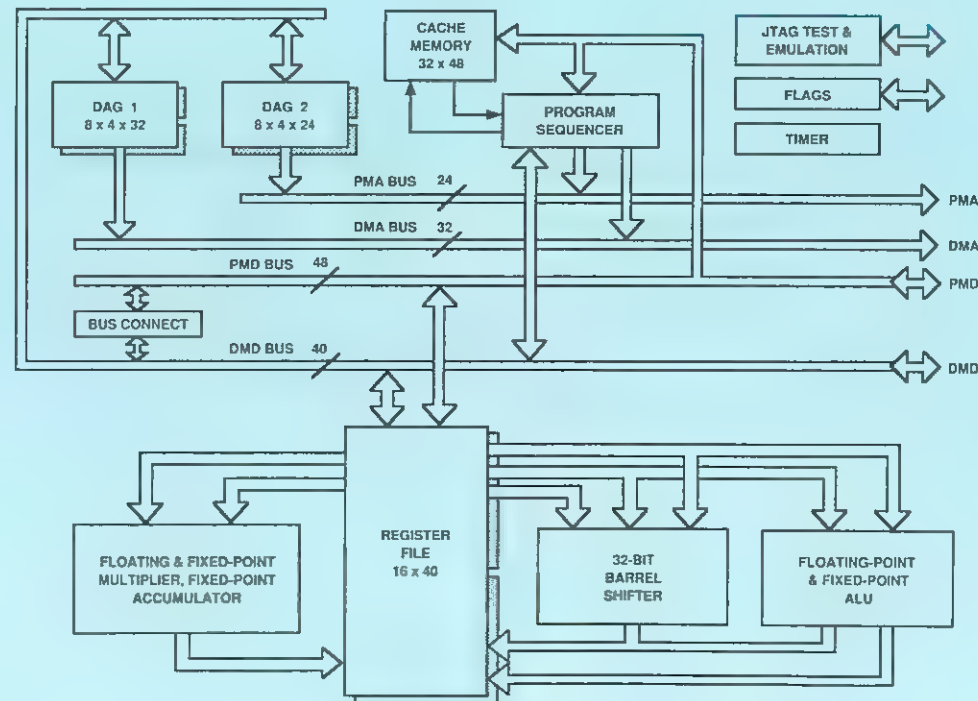
32/40-Bit IEEE Floating-Point DSP Microprocessor

ADSP-21020

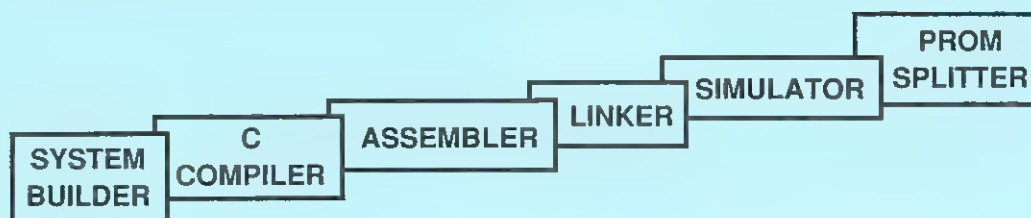
IEEE Floating-Point DSP Processor
Off-Chip Harvard Architecture Maximizes Signal Processing Performance
50 ns, 20 MIPS Instruction Rate, Single-Cycle Execution
60 MFLOPS Peak, 40 MFLOPS Sustained Performance
1024-Point Complex FFT Benchmark: 0.96 ms
Divide (y/x): 300 ns
Inverse Square Root ($1/\sqrt{x}$): 450 ns
32-Bit Single-Precision and 40-Bit Extended-Precision IEEE Floating-Point Data Formats
32-Bit Fixed-Point Formats, Integer and Fractional, with 80-Bit Accumulators
IEEE Exception Handling with Interrupt on Exception
Three Independent Computation Units: Multiplier, ALU, and Barrel Shifter
Dual Data Address Generators with Indirect, Immediate, Modulo, and Bit Reverse Addressing Modes
Two Off-Chip Memory Transfers in Parallel with Instruction Fetch and Single-Cycle Multiply & ALU Operations
Multiply with Add & Subtract for FFT Butterfly Computation
Efficient Program Sequencing with Zero-Overhead Looping: Single-Cycle Loop Setup & Exit
Single-Cycle Register File Context Switch
35 ns External RAM Access Time for Zero-Wait-State, 50 ns Instruction Execution
IEEE JTAG Standard 1149.1 Test Access Port
On-Chip Emulation Circuitry
223-Pin PGA Package (Plastic and Ceramic)

APPLICATIONS

3D Graphics
Image Processing
Speech Processing
DSP Algorithms, Fast Fourier Transforms



DSP Software Development Tools (See model numbers on next page)



Development Software System Builder, Assembler, Linker, PROM Splitter

SYSTEM BUILDER

Architecture Description File Specifies Target Hardware

ASSEMBLER

Incorporates an Easy-to-Program Algebraic Syntax
Supports High Level Constructs
Supports Flexible Macro Processing
Encourages Modular Code Development
Provides a Full Range of Diagnostics

LINKER

Creates an Executable Program from Object Files
Library Support
Maps Assembler Outputs to Target Hardware

PROM SPLITTER

Formats ROM Memory Image for Uploading to PROM Programmers

Simulator

SIMULATOR

Reconfigurable Windowing Graphical User Interface
Full Symbolic Disassembly
Simulates Hardware Configuration
Simulates Port and Serial Port I/O Handling
Flags Illegal Operations
Advanced Debugging Features
Profiling for Checking Code Efficiency

C Compiler & Runtime Library

C COMPILER & RUNTIME LIBRARY

Programming in C Eases Development of Applications Software
Supports In-Line Assembly Code
Provides FRACT Data Type (1.15 Format) for DSP Algorithms
Complete Calling Interface to Assembly Language Routines
Produces ROMable Code
Floating-Point Emulation Support
Conforms to ANSI Draft Standard (X3J11)
Incorporates Optimizing Algorithms to Speed Up the Execution of Code
Includes an Extensive Runtime Library with over 100 ANSI Standard, Mathematical, and DSP-Specific Functions

Software Development Tool Model Numbers*

ADSP-2100 Fixed-Point Family

(for ADSP-2100A, ADSP-2101, ADSP-2105, ADSP-2111, ADSP-21msp50)

DEVELOPMENT SOFTWARE

ADDS-21XX-DSW-PC for IBM PC & Compatibles
ADDS-21XX-DSW-SUN for SUN4

DEVELOPMENT SOFTWARE WITH C COMPILER AND RUNTIME LIBRARY

ADDS-21XX-BUN-PC
ADDS-21XX-BUN-SUN
ADDS-21XX-BUN-VAX

ADSP-21000 Floating-Point Family

(for ADSP-21020 and ADSP-21010 [under development])

DEVELOPMENT SOFTWARE

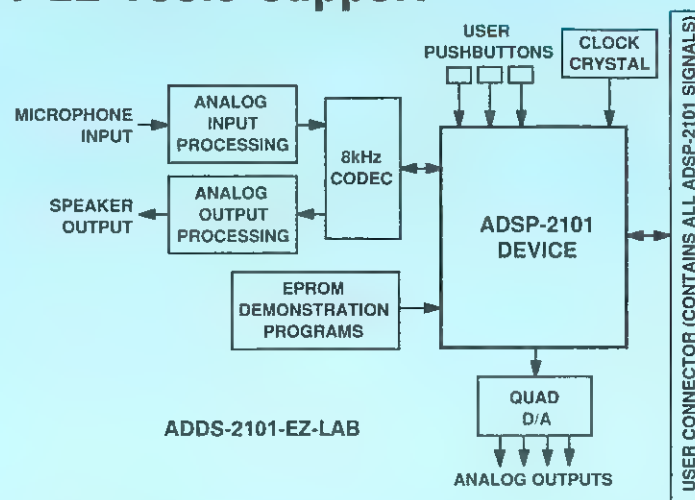
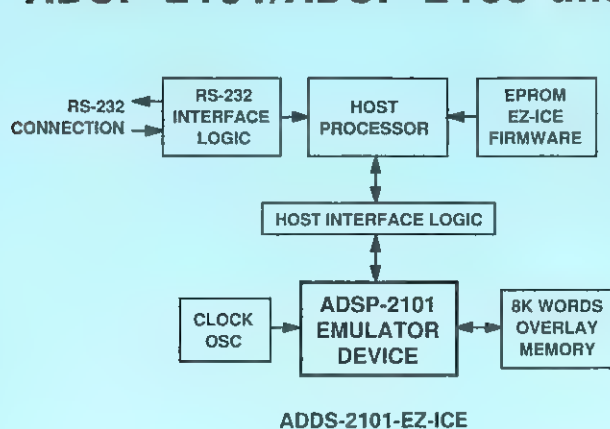
ADDS-210XX-DSW-PC
ADDS-210XX-DSW-SUN

DEVELOPMENT SOFTWARE WITH C COMPILER AND RUNTIME LIBRARY

ADDS-210XX-BUN-PC
ADDS-210XX-BUN-SUN

*See Product Descriptions on prior page.

ADSP-2101/ADSP-2105 and ADSP-2111 EZ-Tools Support



EZ-ICE™ Emulator

Models: ADDS-2101-EZ-ICE, ADDS-2111-EZ-ICE

3.3" × 3.3" Surface-Mount Board with RS-232 Port

Plugs Directly into Processor Socket on Target Board

Full Speed Emulation

Single Step Capability

Sixteen Breakpoints

Memory Upload/Download with a PC

Examine and Alter Registers, Program Memory and Data Memory

8K × 24-Bit High Speed Program/Data Overlay Memory

Replaceable Oscillator

Memory Map (MMAP) Pin Control

Stand-Alone Operation for Software Debugging without Target Board

Easy-to-Learn Menus and Displays

EZ-LAB™ Evaluation Board

Models: ADDS-2101-EZ-LAB, ADDS-2111-EZ-LAB

12.5 MHz ADSP-2101 for ADSP-2111

Microcomputer

64K × 8-Bit Boot EPROM Preprogrammed with Demonstrations

Voice I/O Port with Microphone Input Jack and Speaker Output Jack

Four-Channel, 8-Bit Digital-to-Analog Converter (DAC) Port

Bus Expansion Connector Allows Additional I/O and Full Memory Expansion

Serial Port Expansion Available through SPORT Connector

Replaceable Crystal

Three Switches for User Control: Interrupt IR02, Flag In and Reset

EZ-KIT Development Kit

Model: ADDS-2101-EZ-KIT

ADDSP-2101-EZ-LAB Evaluation Board

Development Software (Assembler and 2101/05 Simulator)

DSP Laboratory Book

Applications Textbook with Example Programs on IBM-PC Disk

ADSP-2100 Processor Family Training Workshop Discount Coupon

EZ-ICE and EZ-LAB are trademarks of Analog Devices, Inc.



ADSP-2100 Family

Full-Featured In-Circuit Emulator (ICE)

Download Program and Verify in Target in Real Time

Same Interactive, User Interface as the Simulator
Windows to Display Registers, Memory, Ports,
Program Variables

Single Stepping Capability, Set Break Points,
Break Conditions and Hardware Event Triggers

Full-Speed 8K Trace Buffer

Modify Assembly Code On-Line

Full Trace of Host Interface Port Accesses;

Trigger on HIP Events (ADDS-2111-ICE)

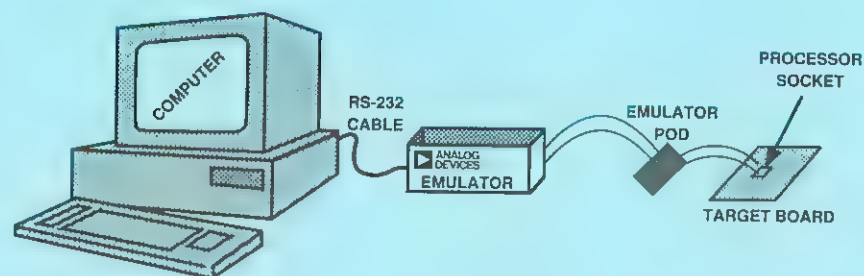
Availability of Emulator Conversion Kits for

Those Designing with More than One

ADSP-2100 Family Processor

Manufactured by Microtek International, Inc.

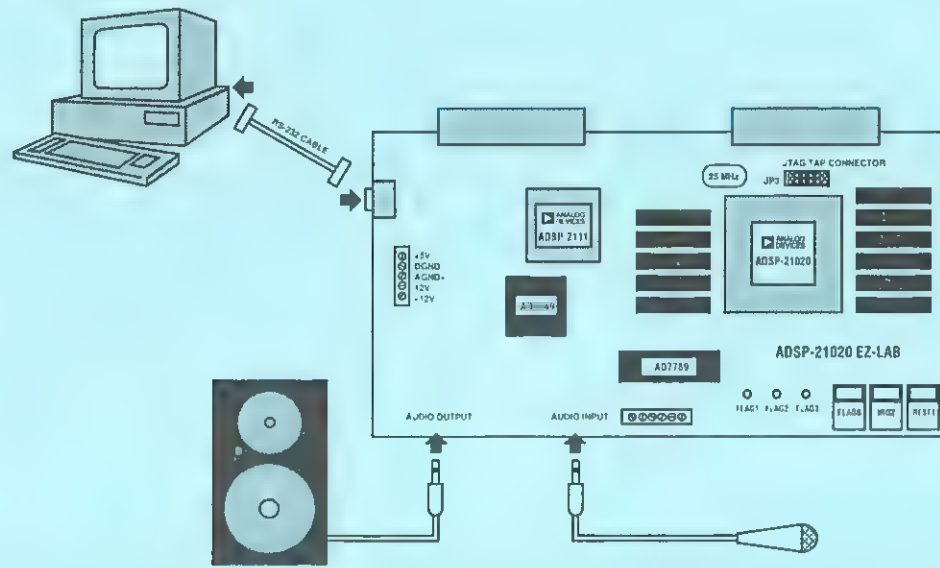
One Year Warranty



MODELS:

ADDS-2100A-ICE, ADDS-2101-ICE, ADDS-2111-ICE

ADSP-21020 Hardware Tools



ADDS-21020-EZ-LAB SETUP FOR AUDIO PROCESSING APPLICATIONS

EZ-ICE Emulator

Model ADDS-21020-EZ-ICE

PC Plug-In Card with Compact Probe Connected with a Ribbon Cable

On-Chip Emulation Provides Nonintrusive Access and Enables Reliable, Full-Speed Performance

Software Breakpoints (Up to 30)

Hardware Break Ranges (5)

Single-Step Execution

Modify and Read All Registers

Upload/Download Program/Data Memory

Same Graphical User Interface as the

ADSP-21020 Simulator

No Impact on Target Loading or Timing

EZ-LAB Evaluation Board

Model ADDS-21020-EZ-LAB

64K Word EPROM Containing Demonstration Software

Download User Programs from PC and Run in Real Time

Operates at 25 MHz

32K Word Static Ram of Both Program Memory and Data Memory

16-Bit Linearly Coded Codec

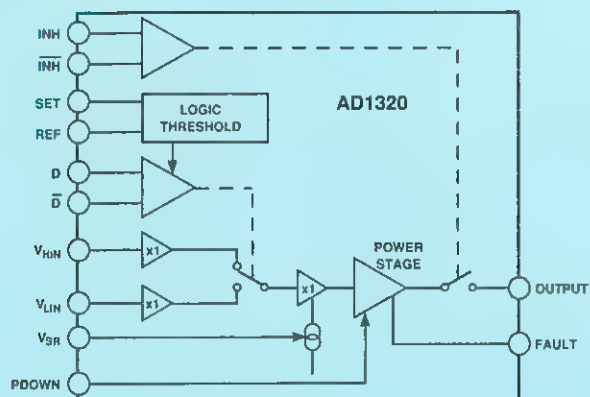
8-Bit Dual A/D and D/A Port

Expansion Connectors for Access to Data,

Address and Control Lines

Can Be Used with EZ-ICE Emulator to Provide a Powerful Software Debug Environment

High Voltage Pin Driver with Inhibit Mode

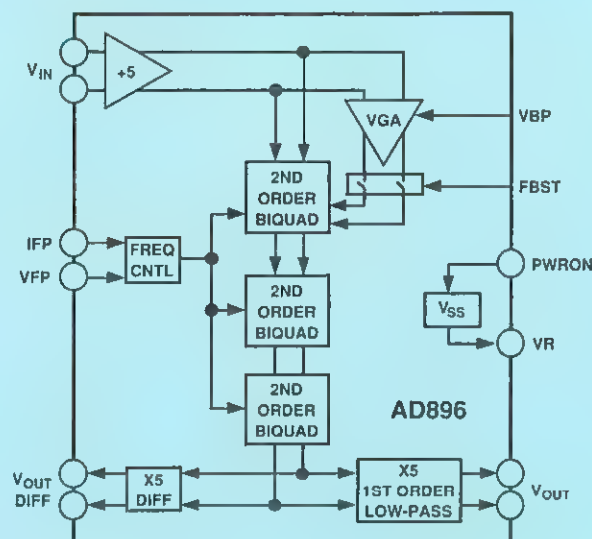


AD1320

FEATURES

- Output Swing Adjustable to 22 V (24 V with ± 16 V Supplies)
- 100 mA Output Current Drive
- Slew Rate to 500 V/ μ s
- Power Down "Stand-By" Mode
- Driver Inhibit Function
- Overcurrent Fault Indicator
- High Speed Differential Inputs

Programmable Filter Chip

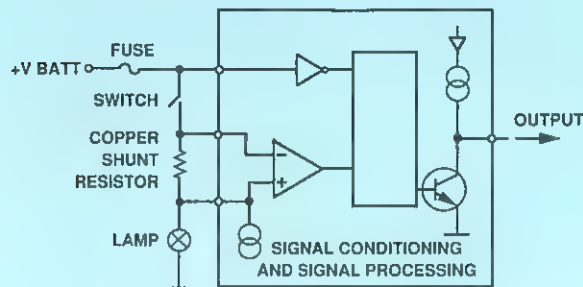


AD896

FEATURES

- Two Versions
 - 13 MHz Cutoff Frequency AD896-13
 - 23 MHz Cutoff Frequency AD896-23
- Fully Programmable
 - Cutoff Frequency
 - Equalization/Boost
- 750 ps Group Delay Variation
- $\pm 10\%$ Cutoff Frequency Accuracy
- +5 V Supply
- 16-Pin SOIC and Plastic DIP

5-Channel Monolithic Comparator for Lamp Monitoring



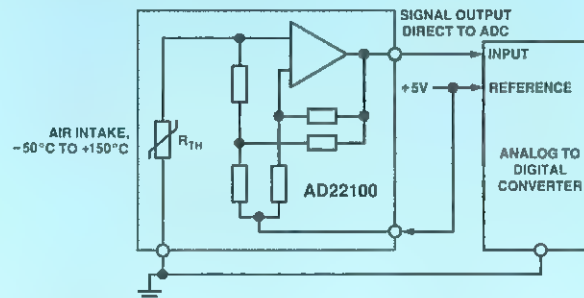
AD22001*

FEATURES

- Continuous Status Checks of Five Bulbs
- Lamp Status Check In "On" and "Off" State
- Status Checks of Two In-Line Fuses
- Very Low Voltage Drop at Sensor Shunt Resistor (Nominal 1.75 mV at 22°C)
- Temperature and Supply Voltage Compensated
- Can Be Powered Directly from Car Battery
- Operating Temperature Range: -40°C to +125°C
- 15 V CMOS Compatible Digital Outputs Signals
- Voltage Limited Power Supply Output for 15 V CMOS Logic ICs

*Patents pending

Monolithic Temperature Sensor with Signal Conditioning

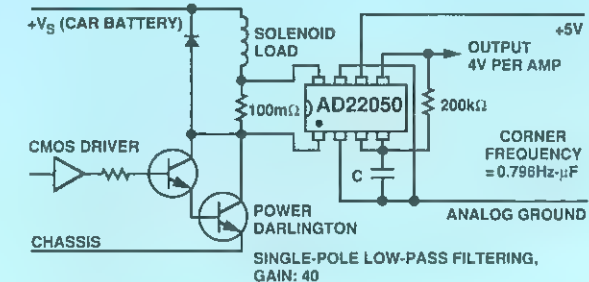


AD22100*

FEATURES

- 200°C Temperature Span
- Accuracy Better Than 2% of Full Scale
- Linearity Better Than $\pm 2^\circ\text{C}$
- Ratiometric Output Voltage: Output Proportional to Temperature \times Supply Voltage
- Reverse Voltage Protection
- Low Quiescent Current: Minimal Self-Heating
- High Level, Low Impedance Output
- 22.5 mV/°C from +5.000 V Supply
- Wide Power Supply Range

Single-Supply Sensor Interface Circuit



AD22050*

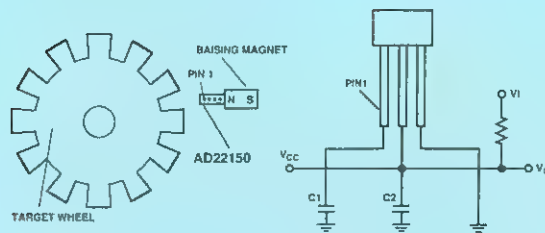
FEATURES

- Gain of $\times 20$ Alterable from $\times 1$ to $\times 160$
- Input CMR from Ground to $6 \times (V_S - 1 \text{ V})$
- Output Span 10 mV to $(V_S - 0.2) \text{ V}$
- 1-, 2-, 3-Pole Low Pass Filtering Available
- Accurate Midscale Offset Capability
- Differential Input Resistance 400 kΩ
- Drives 1 kΩ Load to +4 V Using $V_S = +5 \text{ V}$
- Transient Spike Protection & RFI Filters Included
- Operating Temperature Range -40°C to +125°C

APPLICATIONS

- Current Sensing
- Motor Control
- Interface for Pressure Transducers, Position Indicators, Strain Gages, and Other Low Level Signal Sources

Monolithic Hall Effect Sensor with Signal Conditioning



AD22150*

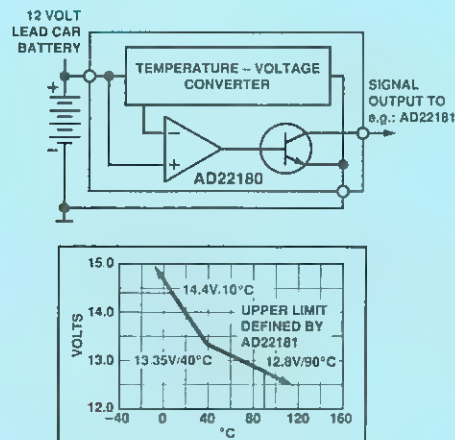
FEATURES

- Sensitive to Small Changes in Field: Operate and Release Points at -12 G and $+12\text{ G}$ Respectively
- Switch Points Moved in Presence of Large Dynamic Fields (Up to $\pm 200\text{ G}$)
- Open Collector Output
- Stable Over -40°C to $+150^\circ\text{C}$ Temperature Range
- Hysteresis Built Into the Output
- Maximum Frequency 50 kHz
- Minimum Frequency User Selectable with One External Capacitor
- Powered Directly by Automobile Battery

*Patents Pending

†Protected by U.S. Patent Re30,586; others pending.

Automotive Battery Monitor Circuit

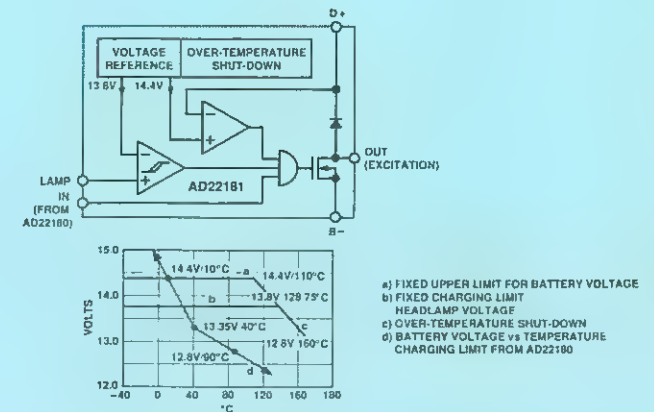


AD22180†

FEATURES

- Measures Automotive Battery Temperature & Voltage
- Built-In Battery Charging Characteristic
- Provides a Signal to Maximize the Battery Charging Without Exceeding the Battery Gassing Voltage at Any Given Temperature
- Signals "Charge Battery" for Battery Voltage Below the Battery Voltage Characteristics of the Figure: $13.35\text{ V @ }40^\circ\text{C} + 35\text{ mV}/^\circ\text{C}$ for Temperatures Below 40°C and $-11\text{ mV}/^\circ\text{C}$ Above 40°C
- TTL Compatible Open Collector Output
- Output Short Circuit Protected
- No External Components Required
- Powered Directly by Automobile Battery with Transient and Reverse Voltage Protection
- Operating Temperature Range -55°C to $+125^\circ\text{C}$

Alternator Control Circuit



AD22181†

FEATURES

- Directly Controls Alternator Excitation
- Temperature Invariant Charging Voltage Limiter
- Over-Temperature Protective Shutdown
- Remote Sensed Headlamp Voltage Charging Limit
- Interface for Battery Temperature: Voltage Charge Control Using AD22180
- Fail-Safe Operation
- Acceleration Cut-Off Model

Voltage-Controlled Amplifier/OVCE

SSM-2018

FEATURES

Wide Dynamic Range

118 dB typ (Class AB)

108 dB typ (Class A)

Wide Gain Range

140 dB typ

Excellent THD and IMD Performance Over Gain, Attenuation and Frequency

Low Control Feedthrough

1 mV typ (Class AB)

Buffered Control Port and Current and Voltage Outputs

Accepts Low or High Impedance Inputs

Low External Parts Count

Low Cost

APPLICATIONS

Voltage-Controlled Amplifiers

Mixing Console Fader Automation Systems

Compressors/Limiters

Noise Gates

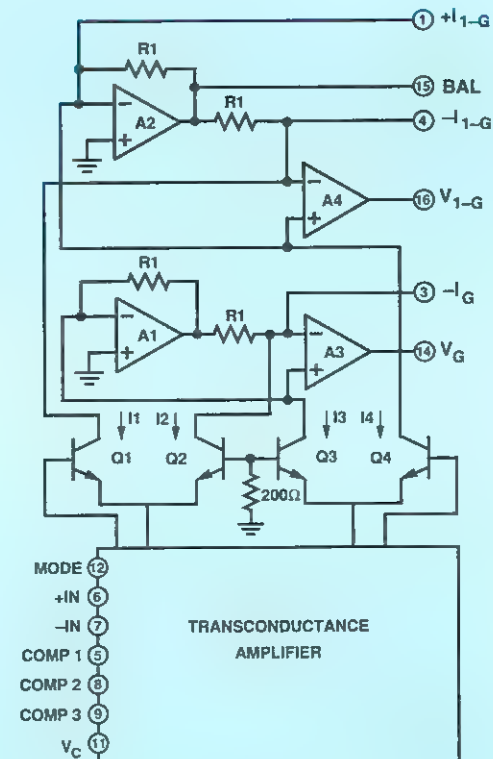
Noise Reduction Systems

Telephone Line Interfaces

Automatic or Remote Volume Controllers

Voltage-Controlled Equalizers

Voltage-Controlled Panners



Dolby* Pro-Logic Surround Matrix Decoder

SSM-2125/SSM-2126

FEATURES

Noise Generator and Autobalance Circuits Are Contained On-Chip

Autobalance On/Off Control

4-Channel Pro-Logic and Dolby 3 (Surround Channel Defeat) Modes Available

Selectable Center Channel Modes—Normal, Wideband, Phantom, Off

Direct Path Bypass (Normal 2-Channel Stereo Mode)

Wide Channel Separation

Center to Left, Right Channels—35 dB min (SSM-2125)

Any Channel to Another—25 dB min (SSM-2126)

Wide Dynamic Range—103 dB typ

Low Total Harmonic Distortion—0.02% typ

Available in a 48-Pin Plastic DIP

CMOS and TTL Compatible Control Logic

APPLICATIONS

Direct View and Projection TV

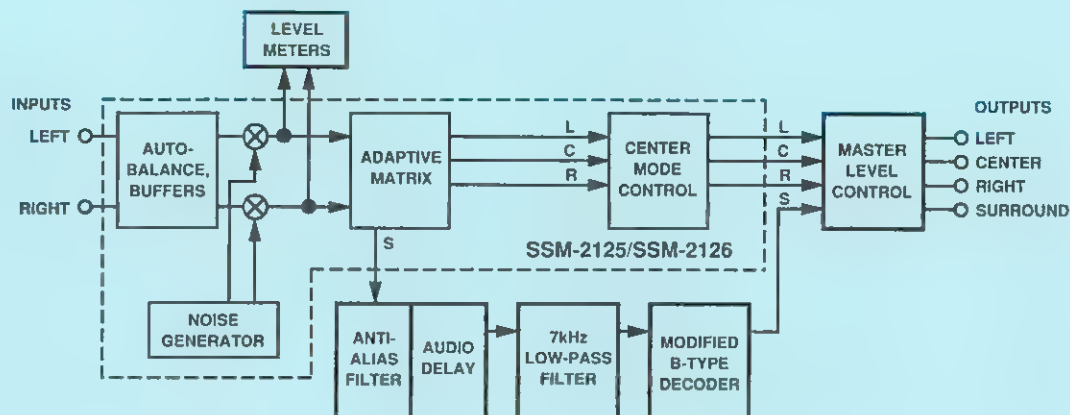
Integrated A/V Amplifiers

Laser Disc and CD-V Players

Video Cassette Recorders

Stand-Alone Surround Decoders

Home Satellite Receiver/Descramblers



*Dolby is a registered trademark of Dolby Laboratories, Inc.

Products Available to Standard Military Drawings

Analog Devices' IC and hybrid products are supplied with processing to the three major levels of military screening, JAN QPL, Standard Military Drawing (SMD) and MIL-STD-883B (Revision C). These products are all produced in facilities which are fully qualified to MIL-M-38510 for integrated circuits, or MIL-STD-1772 for hybrids. In addition to these listings, we also publish a *Military Products Databook* which contains the specification details for designers who specify components for military contracts. The listings here are up-to-date and accurate as of the publication date (10/90), but there is ongoing development in this area by ADI and military procurement agencies. For status of specific parts, please contact your local salesperson. This list will also be updated and published every six months in *Analog Briefings* and in this *Short Form Designers' Guide*.

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-8965501LX	AD7672TQ10/883B	12-Bit High Speed ADC	5962-8680202VA	AD571SD/883B	Complete 10-Bit ADC
5962-8965502LX	AD7672UQ10/883B	12-Bit High Speed ADC	5962-8680201VA	AD570SD/883B	Complete 8-Bit ADC
5962-8965503LX	AD7672TQ05/883B	12-Bit High Speed ADC	5962-8961601VX	ADC-908AX/MD	CMOS Fast 8-Bit A/D Converter
5962-8965504LX	AD7672UQ05/883B	12-Bit High Speed ADC	5962-89616022X	ADC-908BRC/MD	CMOS Fast 8-Bit A/D Converter
5962-8980801JA	AD568SQ/883B	12-Bit Ultrahigh Speed DAC	5962-8961602VX	ADC-908BX/MD	CMOS Fast 8-Bit A/D Converter
5962-89808013A	AD568SE/883B	12-Bit Ultrahigh Speed DAC	5962-8961601YX	AD7574SQ/883B	8-Bit ADC
5962-8512701XA	AD574AUD/883B	Complete 12-Bit ADC	5962-8961602YX	AD7574TQ/883B	8-Bit ADC
5962-8512702XA	AD574ATD/883B	Complete 12-Bit ADC	5962-8961603VX	PM-7574AX/MD	CMOS 8-Bit A/D
5962-8759101LX	AD7572SQ12/883B	Complete 12-Bit 12 μ s ADC	5962-89616042X	PM-7574BRC/MD	CMOS 8-Bit A/D
5962-87591013X	AD7572SE12/883B	Complete 12-Bit 12 μ s ADC	5962-8961604VX	PM-7574BX/MD	CMOS 8-Bit A/D
5962-8759102LX	AD7572TQ12/883B	Complete 12-Bit 12 μ s ADC	5962-8776201VX	AD7575SQ/883B	8-Bit ADC with T/H
5962-87591023X	AD7572TE12/883B	Complete 12-Bit 12 μ s ADC	5962-8776202VX	AD7575TQ/883B	8-Bit ADC with T/H
5962-8759103LX	AD7572UQ12/883B	Complete 12-Bit 12 μ s ADC	5962-87762012X	AD7575SE/883B	8-Bit ADC with T/H
5962-87591033X	AD7572UE12/883B	Complete 12-Bit 12 μ s ADC	5962-87762022X	AD7575TE/883B	8-Bit ADC with T/H
5962-9063201RX	AD7870SQ/883B	12-Bit 100 kHz Sampling ADC	5962-8763501RA	AD670SD/883B	Signal Conditioning 8-Bit ADC
5962-9063202RX	AD7870TQ/883B	12-Bit Sampling ADC	5962-8850502RA	AD673SD/883B	8-Bit ADC
5962-8759104LX	AD7572SQ05/883B	Complete 12-Bit 5 μ s ADC	5962-89518012X	AD7821TE/883B	8-Bit, 600 ns ADC with T/H
5962-87591043X	AD7572SE05/883B	Complete 12-Bit 5 μ s ADC	5962-8951801RX	AD7821TQ/883B	8-Bit, 600 ns ADC with T/H
5962-8759105LX	AD7572TQ05/883B	Complete 12-Bit 5 μ s ADC	5962-8865001RX	AD7820TQ/883B	8-Bit 2 μ s ADC with T/H
5962-87591053X	AD7572TE05/883B	Complete 12-Bit 5 μ s ADC	5962-88650012X	AD7820TE/883B	8-Bit 2 μ s ADC with T/H
5962-8759106LX	AD7572UQ05/883B	Complete 12-Bit 5 μ s ADC	5962-8865002RX	AD7820UQ/883B	8-Bit 2 μ s ADC with T/H
5962-87591063X	AD7572UE05/883B	Complete 12-Bit 5 μ s ADC	5962-88650022X	AD7820UE/883B	8-Bit 2 μ s ADC with T/H
5962-8861501XA	AD674AUD/883B	Complete 12-Bit ADC	5962-8876401LX	AD7824TQ/883B	4-Channel 8-Bit ADC
5962-88615013A	AD674AUE/883B	Complete 12-Bit ADC	5962-8876402LX	AD7824UQ/883B	4-Channel 8-Bit ADC
5962-8861502XA	AD674ATD/883B	Complete 12-Bit ADC	5962-8876403XX	AD7828TQ/883B	8-Channel 8-Bit ADC
5962-88615023A	AD674ATE/883B	Complete 12-Bit ADC	5962-8876404	AD7828UE/883B	8-Channel 8-Bit ADC
5962-8969801	AD7579SQ/883B	10-Bit Sampling ADC with (8 + 2) Loading	5962-8876404XX	AD7828UQ/883B	8-Channel 8-Bit ADC
5962-8969802	AD7580SQ/883B	10-Bit Sampling ADC	5962-8962901LX	AD7569SQ/883B	Complete 8-Bit Analog I/O Sys
5962-8865801XC	AD578SD/883B	Complete 12-Bit ADC	5962-8962902LX	AD7569TQ/883B	Complete 8-Bit Analog I/O Sys
5962-8865802XC	AD578TD/883B	Complete 12-Bit ADC	8300201JX	AD DAC87/883B	12-Bit Hybrid DAC
5962-8865803XC	AD578SZ/883B	Complete 12-Bit ADC	8300301JA	AD DAC87/883B	12-Bit Monolithic DAC
5962-8865804XC	AD578TZ/883B	Complete 12-Bit ADC	5962-8967101LX	DAC-8221AW	Dual 12-Bit Buffered Multiplying CMOS D/A
5962-8850501RA	AD573SD/883B	10-Bit ADC			

Products Available to Standard Military Drawings

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-89671023X	DAC-8221BTC	Dual 12-Bit Buffered Multiplying CMOS D/A	5962-87702062X	PM-7545ARC/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8967201LX	DAC-8222AW/MD	Dual 12-Bit Double-Buffered Multiplying CMOS D/A	5962-8770205RX	PM-7545BR/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8965701LX	AD7547SQ/883B	12-Bit Dual Multiplying DAC	5962-87702052X	PM-7545BRC/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8965702LX	AD7547TQ/883B	12-Bit Dual Multiplying DAC	5962-8877801RX	PM-7645AR/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8965703LX	AD7547UQ/883B	12-Bit Dual Multiplying DAC	5962-88778012X	PM-7645ARC/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8776301LX	AD7537SQ/883B	12-Bit Dual Multiplying DAC	5962-8877802RX	PM-7645BR/MD	12-Bit Buffered Multiplying CMOS D/A
5962-87763013X	AD7537SE/883B	12-Bit Dual Multiplying DAC	5962-88778022X	PM-7645BRC/MD	12-Bit Buffered Multiplying CMOS D/A
5962-8776302LX	AD7537TQ/883B	12-Bit Dual Multiplying DAC	5962-8780101XA	AD567SD/883B	12-Bit High Speed DAC
5962-87763023X	AD7537TE/883B	12-Bit Dual Multiplying DAC	5962-8865901A	AD667SD/883B	12-Bit Dual Buffered DAC
5962-8776303LX	AD7537UQ/883B	12-Bit Dual Multiplying DAC	5962-88659013A	AD667SE/883B	12-Bit Buffered DAC
5962-87763033X	AD7537UE/883B	12-Bit Dual Multiplying DAC	5962-8961701LA	AD767SD/883B	12-Bit Buffered DAC
5962-8876501RX	AD7549SQ/883B	12-Bit Dual DAC	5962-8850901X	AD390SD/883B	12-Bit Quad DAC
5962-8876502RX	AD7549TQ/883B	12-Bit Dual DAC	5962-8850902X	AD390TD/883B	12-Bit Quad DAC
5962-8876601LX	AD7245SQ/883B	12-Bit DACPORT	5962-8851001X	AD394SD/883B	12-Bit Quad DAC
5962-8876602RX	AD7248SQ/883B	12-Bit DACPORT	5962-8851002X	AD394TD/883B	12-Bit Quad DAC
5962-89697013X	AD7846SE/883B	16-Bit V_{OUT} Multiplying DAC	5962-8851003X	AD395SD/883B	12-Bit Quad DAC
5962-8969701XX	AD7846SQ/883B	16-Bit V_{OUT} Multiplying DAC	5962-8851004X	AD395TD/883B	12-Bit Quad DAC
5962-8876701LX	AD7845SQ/883B	12-Bit V_{OUT} Multiplying DAC	5962-89932012X	DAC-08RC/MD	8-Bit High Speed Multiplying D/A Converter
5962-8948104VX	PM-7541AAX/MD	CMOS 12-Bit Monolithic Multiplying CMOS D/A	5962-8770001EX	AD7524SQ/883B	8-Bit DAC
5962-8948103VX	PM-7541ABX/MD	CMOS 12-Bit Monolithic Multiplying CMOS D/A	5962-8770002EX	AD7524TQ/883B	8-Bit DAC
5962-89481032X	PM-7541ABRC/MD	CMOS 12-Bit Monolithic Multiplying CMOS D/A	5962-8770003EX	AD7524UQ/883B	8-Bit DAC
5962-89481012X	AD7541ASE/883B	12-Bit Multiplying DAC	5962-87700012X	AD7524SE/883B	8-Bit DAC
5962-8948101VX	AD7541ASQ/883B	12-Bit Multiplying DAC	5962-87700022X	AD7524TE/883B	8-Bit DAC
5962-89481022X	AD7541ATE/883B	12-Bit Multiplying DAC	5962-87700032X	AD7524UE/883B	8-Bit DAC
5962-8948102VX	AD7541ATQ/883B	12-Bit Multiplying DAC	5962-89471012X	AD7111TE/883B	CMOS Logarithmic DAC
5962-8770201RX	AD7545SQ/883B	12-Bit Multiplying DAC	5962-8947101EX	AD7111TD/883B	CMOS Logarithmic DAC
5962-8770202RX	AD7545TQ/883B	12-Bit Multiplying DAC	5962-89471022X	AD7111UE/883B	CMOS Logarithmic DAC
5962-8770203RX	AD7545UQ/883B	12-Bit Multiplying DAC	5962-8947102EX	AD7111UD/883B	CMOS Logarithmic DAC
5962-8770204RX	AD7545GUQ/883B	12-Bit Multiplying DAC	5962-8770003EX	PM-7524AQ/MD	CMOS 8-Bit Buffered Multiplying D/A
5962-87702012X	AD7545SE/883B	12-Bit Multiplying DAC	5962-87700032X	PM-7524ARC/MD	CMOS 8-Bit Buffered Multiplying D/A
5962-87702022X	AD7545TE/883B	12-Bit Multiplying DAC	5962-87700022X	PM-7524BRC/MD	CMOS 8-Bit Buffered Multiplying D/A
5962-87702032X	AD7545UE/883B	12-Bit Multiplying DAC			
5962-87702042X	AD7545GUE/883B	12-Bit Multiplying DAC			
5962-8770206RX	PM-7545AR/MD	12-Bit Buffered Multiplying CMOS D/A			

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-8770002EX	PM-7524BQ/MD	CMOS 8-Bit Buffered Multiplying D/A	5962-8958102GX	REF-01J/MD	+10 V Precision Voltage Reference
5962-8770101RX	AD7528SQ/883B	8-Bit Dual Buffered DAC	5962-89581022X	REF-01RC/MD	+10 V Precision Voltage Reference
5962-87701012X	AD7528SE/883B	8-Bit Dual Buffered DAC	5962-8958102PX	REF-01Z/MD	+10 V Precision Voltage Reference
5962-8770102RX	AD7528TQ/883B	8-Bit Dual Buffered DAC	5962-8551401GX	REF-02AJ/MD	+5 V Precision Voltage Reference/ Temp Transducer
5962-87701022X	AD7528TE/883B	8-Bit Dual Buffered DAC	5962-85514012X	REF-02ARC/MD	+5 V Precision Voltage Reference/ Temp Transducer
5962-8770103RX	AD7528UQ/883B	8-Bit Dual Buffered DAC	5962-8551401PX	REF-02AZ/MD	+5 V Precision Voltage Reference/ Temp Transducer
5962-87701032X	AD7528UE/883B	8-Bit Dual Buffered DAC	5962-8947901GX	REF-10AJ/MD	+10 V Precision Voltage Reference (Longterm Stability)
5962-8770103RX	PM-7528AR/MD	Dual 8-Bit Buffered Multiplying CMOS D/A	5962-8947902GX	REF-10BJ/MD	+10 V Precision Voltage Reference (Longterm Stability)
5962-87701032X	PM-7528ARC/MD	Dual 8-Bit Buffered Multiplying CMOS D/A	5962-8686101XC	AD580SH/883B	Precision +2.5 V Reference
5962-8770102RX	PM-7528BR/MD	Dual 8-Bit Buffered Multiplying CMOS D/A	5962-8686102XC	AD580TH/883B	Precision +2.5 V Reference
5962-87701022X	PM-7528BRC/MD	Dual 8-Bit Buffered Multiplying CMOS D/A	5962-8982401PA	AD586SQ/883B	High Precision 5 V Reference Converter
5962-8778901EA	AD558SD/883B	8-Bit DACPORT	5962-8982402PA	AD586TQ/883B	High Precision 5 V Reference Converter
5962-8778902EA	AD558TD/883B	8-Bit DACPORT	5962-8982501PA	AD587SQ/883B	High Precision 10 V Reference Converter
5962-87789012A	AD558SE/883B	8-Bit DACPORT	5962-8982502PA	AD587TQ/883B	High Precision 10 V Reference Converter
5962-87789022A	AD558TE/883B	8-Bit DACPORT	5962-8982503PA	AD587UQ/883B	High Precision 10 V Reference Converter
5962-86678010X	DAC-8408AT/MD	Quad 8-Bit Multiplying CMOS D/A with Memory	5962-8972801EA	AD588SD/883B	Programmable Reference Converter
5962-86678020X	DAC-8408BT/MD	Quad 8-Bit Multiplying CMOS D/A with Memory	5962-89728012A	AD588SE/883B	Programmable Reference Converter
5962-8780201RX	AD7226TQ/883B	8-Bit Quad DAC with Amps	5962-8972802EA	AD588TD/883B	Programmable Reference Converter
5962-87802012X	AD7226TE/883B	8-Bit Quad DAC with Amps	5962-89728022A	AD588TE/883B	Programmable Reference Converter
5962-8866301LX	AD7228TQ/883B	8-Bit Octal Voltage Out DAC	5962-8686103XA	AD580UH/883B	Precision +2.5 V Reference
5962-88663013X	AD7228TE/883B	8-Bit Octal Voltage Out DAC	5962-8688201XA	AD581SH/883B	Precision +10 V Reference
5962-8866302LX	AD7228UQ/883B	8-Bit Octal Voltage Out DAC	5962-8688202XA	AD581TH/883B	Precision +10 V Reference
5962-88663023X	AD7228UE/883B	8-Bit Octal Voltage out DAC	5962-8688203XA	AD581UH/883B	Precision +10 V Reference
5962-8503001YX	AD2700SD/883B	Precision +10 V Reference	5962-8757101XA	AD590JF/883B	Temp. Transducer 1 μ A/K
5962-8503002YX	AD2700UD/883B	Precision +10 V Reference	5962-8757101YA	AD590JH/883B	Temp. Transducer 1 μ A/K
5962-8503005YX	AD2701SD/883B	Precision -10 V Reference	5962-8757102XA	AD590KF/883B	Temp. Transducer 1 μ A/K
5962-8503006YX	AD2701TD/883B	Precision -10 V Reference	5962-8757102YA	AD590KH/883B	Temp. Transducer 1 μ A/K
5962-8503003YX	AD2702SD/883B	Precision ± 10 V Reference	5962-8757103XA	AD590LF/883B	Temp. Transducer 1 μ A/K
5962-8503004YX	AD2702UD/883B	Precision ± 10 V Reference	5962-8757103YA	AD590LH/883B	Temp. Transducer 1 μ A/K
5962-8958101GX	REF-01AJ/MD	+10 V Precision Voltage Reference	5962-8757104XA	AD590MF/883B	Temp. Transducer 1 μ A/K
5962-89581012X	REF-01ARC/MD	+10 V Precision Voltage Reference	5962-8757104YA	AD590MH/883B	Temp. Transducer 1 μ A/K
5962-8958101PX	REF-01AZ/MD	+10 V Precision Voltage Reference	5962-8987101GX	CMP-01J/MD	Fast Precision Comparator
			5962-8987101PX	CMP-01Z/MD	Fast Precision Comparator

Products Available to Standard Military Drawings

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-8990403CX	CMP-04BY/MD	Quad Low Power Precision Comparator	5962-8971003XX	ADG526ATE/883B	16-Channel Latched Multiplexer
5962-8990401CX	CMP-404AY/MD	Quad Low Power Precision Comparator	5962-8771701XX	MUX-16AT/MD	16-Channel JFET Analog Multiplexer
5962-8990402CX	CMP-404BY/MD	Quad Low Power Precision Comparator	5962-8771702XX	MUX-16BT/MD	16-Channel JFET Analog Multiplexer
5962-7801903EA	AD96687TQ/883B	Voltage Comparator	5962-87717023X	MUX-16BTC/MD	16-Channel JFET Analog Multiplexer
5962-78019032A	AD96687TE/883B	Voltage Comparator	5962-8771601EX	MUX-08AQ/MD	8-Channel JFET Analog Multiplexers
5962-8600804EA	AD96685TQ/883B	Voltage Comparator	5962-8771602EX	MUX-08BQ/MD	8-Channel JFET Analog Multiplexers
5962-86008042A	AD96685TE/883B	Voltage Comparator	5962-87716022X	MUX-08BRC/MD	8-Channel JFET Analog Multiplexers
5962-8600804IA	AD96685TH/883B	Voltage Comparator	7705201EX	ADG508ATQ/883B	8-Channel Analog Mux
5962-86877012X	PM-111RC/MD	Precision Voltage Comparator	5962-8768901VX	ADG528ATQ/883B	8-Channel Latched Mux
5962-8601401CX	PM-119Y/MD	Precision High Speed Dual Comparator	5962-90635	ADG528ATE/883B	8-Channel Latched Multiplexer
5962-86014012X	PM-119RC/MD	Precision, High Speed, Dual Comparator	77052012X	ADG508ATE/883B	8-Channel Analog Mux
5962-87739012X	PM-139ARC/MD	Quad Low Power Voltage Comparator	5962-8771801EX	MUX-24AQ/MD	Dual 4-Channel JFET Analog Multiplexer
5962-8773901CX	PM-139AY-MD	Quad Low Power Voltage Comparator	5962-8771802EX	MUX-24BQ/MD	Dual 4-Channel JFET Analog Multiplexer
5962-77008012X	PM-139RC/MD	Quad Low Power Voltage Comparator	5962-89710023X	ADG527ATE/883B	Dual 8-Channel Latched Multiplexer
5962-7700801CX	PM-139Y/MD	Quad Low Power Voltage Comparato	5962-8971002XX	ADG527ATQ/883B	Dual 8-Channel Latched Multiplexer
5962-8780201RX	PM-7226AR/MD	Quad 8-Bit CMOS D/A with Voltage Output	7705201EX	ADG508ATQ/883B	8-Channel Analog Multiplexer
5962-8754001CA	AD585SQ/883B	High Speed S/H Amp	5962-8671601EX	ADG201HSTQ/883B	Quad SPST Fast Switch
5962-8954103CX	SMP-10AY/MD	Low Droop Rate Sample-and-Hold Amp	5962-86716012X	ADG201HSTE/883B	Quad SPST Fast Switch
5962-8954104CX	SMP-10BY/MD	Low Droop Rate Sample-and-Hold Amp	77053022X	ADG201ATE/883B	Quad SPST Analog Switch
5962-89541042X	SMP-10BRC/MD	Low Droop Rate Sample-and-Hold Amp	7705302EX	ADG201ATQ/883B	Quad SPST Analog Switch
5962-8954101CX	SMP-11AY/MD	Accurate Sample-and-Hold Amp	5962-8966901EX	SW-06BQ/MD	Quad SPST JFET Analog Switch
5962-89541022X	SMP-11BRC/MD	Accurate Sample-and-Hold Amp	5962-89669012X	SW-06BRC/MD	Quad SPST JFET Analog Switch
5962-8954102CX	SMP-11BY/MD	Accurate Sample-and-Hold Amp	5962-8773501XC	ADSP-2100SG/883B	6 MHz Digital Signal μ P
5962-87719	AD625/883B	Instrumentation Amp	5962-8773503XC	ADSP-2100ASG/883B	8 MHz Digital Signal μ P
5962-88539	AD524/883B	Instrumentation Amp	5962-8773504XC	ADSP-2100ATG/883B	10 MHz Digital Signal μ P
5962-8863001VX	AMP-01AX/MD	Low Noise, Precision Instrumentation Amp	5962-8203601GX	OP-07AJ/MD	Ultralow Offset Voltage Op Amp
5962-88630023X	AMP-01BTC/MD	Low Noise, Precision Instrumentation Amp	5962-82036012X	OP-07ARC/MD	Ultralow Offset Voltage Op Amp
5962-8863002VX	AMP-01BX/MD	Low Noise, Precision Instrumentation Amp	5962-8203601PX	OP-07AZ/MD	Ultralow Offset Voltage Op Amp
5962-8857901XC	HOS-050A/883B	Video Op Amp	5962-8203602GX	OP-07J/MD	Ultralow Offset Voltage Op Amp
5962-8857902XC	HOS-060SH/883B	Video Op Amp	5962-82036022X	OP-07RC/MD	Ultralow Offset Voltage Op Amp
5962-8873301XC	ADSP-1010BTD/883B	Digital Signal Multiplier	5962-8203602PX	OP-07Z/MD	Ultralow Offset Voltage Op Amp
5962-8873302XC	ADSP-1010BSD/883B	Digital Signal Multiplier	5962-89801012X	OP-11ARC/MD	Quad Matched 741-Type Op Amp
5962-8873303XC	ADSP-1010BSD/883B	75 ns Digital Signal Multiplier	5962-8980101CX	OP-11AY/MD	Quad Matched 741-Type Op Amp
5962-8873301ZC	ADSP-1010BTG/883B	Digital Signal Multiplier	5962-89801022X	OP-11BRC/MD	Quad Matched 741-Type Op Amp
5962-8873302ZC	ADSP-1010BSG/883B	Digital Signal Multiplier	5962-8980102CX	OP-11BY/MD	Quad Matched 741-Type Op Amp
5962-8873303ZC	ADSP-1010BSG/883B	75 ns Digital Signal Multiplier	5962-8771401GX	OP-14AJ/MD	Dual Matched High Performance Op Amp
5962-8971001XX	ADG526ATQ/883B	16-Channel Latched Multiplexer			

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-8771401PX	OP-14AZ/MD	Dual Matched High Performance Op Amp	5962-8688701CX	OP-227AY/MD	Dual Low Noise, Low Offset Instr, Op Amp
5962-8771402GX	OP-14BJ/MD	Dual Matched High Performance Op Amp	5962-9053601GX	OP-260AJ/MD	Dual High Speed, Current Feedback Op Amp
5962-8771402PX	OP-14BZ/MD	Dual Matched High Performance Op Amp	5962-90536012X	OP-260ARC/MD	Dual High Speed, Current Feedback Op Amp
5962-8954201GX	OP-15AJ/MD	Precision JFET-Input Op Amp	5962-9053601PX	OP-260AZ/MD	Dual High Speed, Current Feedback Op Amp
5962-8954201PX	OP-15AZ/MD	Precision JFET-Input Op Amp	5962-88721012X	OP-270ARC/MD	Dual Very Low Noise, Precision Op Amp
5962-8954202GX	OP-15BJ/MD	Precision JFET-Input Op Amp	5962-8872101PX	OP-270AZ/MD	Dual Very Low Noise, Precision Op Amp
5962-8954301GX	OP-16AJ/MD	Precision JFET-Input Op Amp	5962-88721022X	OP-271ARC/MD	High Speed, Dual Op Amp
5962-8954301PX	OP-16AZ/MD	Precision JFET-Input Op Amp	5962-8872102PX	OP-271AZ/MD	High Speed, Dual Op Amp
5962-8954302GX	OP-16BJ/MD	Precision JFET-Input Op Amp	5962-8978301PX	OP-290AZ/MD	Precision, Low Power, Micropower Dual Op Amp
5962-8954302PX	OP-16CZ/MD	Precision JFET-Input Op Amp	5962-89783012X	OP-290ARC/MD	Precision, Low Power, Micropower Dual Op Amp
5962-8770601GX	OP-17AJ/MD	Precision JFET-Input Op Amp	5962-8853701GX	OP-37AJ/MD	Low Noise, Precision, High Speed Op Amp
5962-8770601PX	OP-17AZ/MD	Precision JFET-Input Op Amp	5962-8853701PX	OP-37AZ/MD	Low Noise, Precision, High Speed Op Amp
5962-8770602GX	OP-17BJ/MD	Precision JFET-Input Op Amp	5962-8853702GX	OP-37BJ/MD	Low Noise, Precision, High Speed Op Amp
5962-8770602PX	OP-17BZ/MD	Precision JFET-Input Op Amp	5962-88537022X	OP-37BRC/MD	Low Noise, Precision, High Speed Op Amp
5962 88593012X	OP-200ARC/MD	Dual Low Offset, Low Power Op Amp	5962-8853702PX	OP-37BZ/MD	Low Noise, Precision, High Speed Op Amp
5962-8859301PX	OP-200AZ/MD	Dual Low Offset, Low Power Op Amp	5962-8853703GX	OP-37CJ/MD	Low Noise, Precision, High Speed Op Amp
5962-8771501CX	OP-207AY/MD	Dual Ultralow V_{OS} Matched Op Amp	5962-87771013X	OP-400ATC/MD	Quad Low Offset, Low Power Op Amp
5962-8853801GX	OP-215AJ/MD	Dual Precision JFET-Input Op Amp	5962-8777101CX	OP-400AY/MD	Quad Low Offset, Low Power Op Amp
5962-88538012X	OP-215ARC/MD	Dual Precision JFET-Input Op Amp	5962-8855901CX	OP-421BY/MD	Quad Low Power Op Amp (Single or Dual Supply)
5962-8853801PX	OP-215AZ/MD	Dual Precision JFET-Input Op Amp			
5962-8853802GX	OP-215BJ/MD	Dual Precision JFET-Input Op Amp			
5962-88538032X	OP-215BRC/MD	Dual Precision JFET-Input Op Amp			
5962-8853802PX	OP-215BZ/MD	Dual Precision JFET-Input Op Amp			

Products Available to Standard Military Drawings

SMD Part Number	Generic Part Number	Description	SMD Part Number	Generic Part Number	Description
5962-8855902CX	OP-421CY/MD	Quad Low Power Op Amp (Single or Dual Supply)	5962-87738012X	OP-77BRC/MD	Next Generation OP-07 (Ultralow Offset Voltage Op Amp)
5962-8851301GX	OP-42AJ/MD	High Speed, Fast Settling, Precision Op Amp	5962-8773801PX	OP-77BZ/MD	Next Generation OP-07 (Ultralow Offset Voltage Op Amp)
5962-88513012X	OP-42ARC/MD	High Speed, Fast Settling, Precision Op Amp	5962-8954401GX	OP-97AJ/MD	Low Power, High Precision Op Amp
5962-8851301PX	OP-42AZ/MD	High Speed, Fast Settling, Precision Op Amp	5962-8954401PX	OP-97AZ/MD	Low Power, High Precision Op Amp
5962-8980401GX	OP-44AJ/MD	High Speed, Precision Op Amp	5962-9095501M2A	AD640TE/883B	120 MHz Demodulating DC Coupled Log Amp
5962-8980401PX	OP-44AZ/MD	High Speed, Precision Op Amp	5962-9095501MRA	AD640TD/883B	120 MHz Demodulating DC Coupled Log Amp
5962-89804012X	OP-44ARC/MD	High Speed, Precision Op Amp	5962-8980701RA	AD630SD/883B	Balanced Modulator/Demodulator
5962-9053501GX	OP-64AJ/MD	High Speed, Wide Bandwidth Op Amp	5962-89807012A	AD630SE/883B	Balanced Modulator/Demodulator
5962-9053501PX	OP-64AZ/MD	High Speed, Wide Bandwidth Op Amp	5962-8963701CA	AD637SQ/883B	Wideband RMS-DC Converter
5962-90535012X	OP-64ARC/MD	High Speed, Wide Bandwidth Op Amp	5962-8980901EA	AD539SD/883B	High Speed, 2-Channel, 2 Quadrant Multiplier
5962-88565012X	OP-470ARC/MD	Very Low Noise, Quad Op Amp	5962-89654013X	AD9012SE/883B	8-Bit, 75 MSPS TTL ADC
5962-88565013X	OP-470ATC/MD	Very Low Noise, Quad Op Amp	5962-8965401XX	AD9012SQ/883B	8-Bit, 75 MSPS TTL ADC
5962-8856501CX	OP-470AY/MD	Very Low Noise, Quad Op Amp	5962-89654023X	AD9012TE/883B	8-Bit, 75 MSPS TTL ADC
5962-88565022X	OP-471ARC/MD	High Speed, Low Noise, Quad Op Amp	5962-8965402XX	AD9012TQ/883B	8-Bit, 75 MSPS TTL ADC
5962-88565023X	OP-471ATC/MD	High Speed, Low Noise, Quad Op Amp	5962-9092702MXX	AD9048SQ/883B	8-Bit, 35 MSPS Video ADC
5962-8856502CX	OP-471AY/MD	High Speed, Low Noise, Quad Op Amp	5962-9092702M3X	AD9048SE/883B	8-Bit, 35 MSPS Video ADC
5962-8967001CX	OP-490AY/MD	Low Voltage, Micropower, Quad Op Amp	5962-9092701MXX	AD9048TQ/883B	8-Bit, 35 MSPS Video ADC
5962-89670013X	OP-490ATC/MD	Low Voltage, Micropower, Quad Op Amp	5962-9092701M3X	AD9048TE/883B	8-Bit, 35 MSPS Video ADC
5962-8967301CX	OP-50AY/MD	High Output-Current Op Amp (AVCL ≥ 5)			
5962-8967302CX	OP-50BY/MD	High Output-Current Op Amp (AVCL ≥ 5)			
5962-8773802GX	OP-77AJ/MD	Next Generation OP-07 (Ultralow Offset Voltage Op Amp)			
5962-8773802PX	OP-77AZ/MD	Next Generation OP-07 (Ultralow Offset Voltage Op Amp)			
5962-8773801GX	OP-77BJ/MD	Next Generation OP-07 (Ultralow Offset Voltage Op Amp)			

MIL-STD-883 Class B Products

AD2S80	AD570	AD688	AD7111	AD7576	AD9901	ADSP-3210/20	MAT-01	OP-97	PM-7533
AD2S80A	AD571	AD689	AD7118	AD7578	AD96685	ADSP-3211	MAT-02	OP-160	PM-7541
AD346	AD572	AD707	AD7224	AD7579	AD96687	ADSP-3212/22	MAT-03	OP-177	PM-7541A
AD380	AD573	AD708	AD7225	AD7580	AD ADC85S-12	ADSP-3221	MAT-04	OP-200	PM-7542
AD381	AD574A	AD711	AD7226	AD7582	AD ADC85SZ-12	ADV453	MUX-08	OP-207	PM-7543
AD382	AD578	AD712	AD7228	AD7590/1DI	ADC-908	ADVFC32	MUX-16	OP-215	PM-7545
AD386	AD579	AD713	AD7237	AD7592DI	ADC-910	AMP-01	MUX-24	OP-220	PM-7548
AD390	AD580	AD734	AD7245	AD7628	ADC-912	AMP-02	MUX-28	OP-221	PM-7574
AD394	AD581	AD741	AD7247	AD7672	ADC-912A	AMP-05	OP-01	OP-227	PM-7628
AD395	AD582	AD744	AD7248	AD7820	AD DAC87	BUF-03	OP-02	OP-249	PM-7645
AD396	AD584	AD746	AD7501	AD7821	ADG201A & HS	CMP-01	OP-04	OP-260	REF-01
AD509	AD585	AD767	AD7502	AD7824	ADG202A	CMP-04	OP-05	OP-270	REF-02
AD517	AD586	AD774B	AD7503	AD7828	ADG221	CMP-05	OP-06	OP-271	REF-05
AD518	AD587	AD790	AD7506	AD7840	ADG222	CMP-08	OP-07	OP-290	REF-08
AD521	AD588	AD834	AD7507	AD7845	ADG506A/507A	CMP-404	OP-08	OP-297	REF-10
AD522	AD589	AD840	AD7510DI	AD7846	ADG508A/509A	DAC-01	OP-09	OP-400	REF-43
AD524	AD590	AD841	AD7511DI	AD7870	ADG526A/527A	DAC-05	OP-10	OP-420	SMP-11
AD526	AD624	AD842	AD7512DI	AD9000	ADG528A/529A	DAC-06	OP-11	OP-421	SW-01
AD532	AD625	AD843	AD7520	AD9002	AD OP-07	DAC-08	OP-12	OP-470	SW-06
AD534	AD630	AD844	AD7521	AD9012	AD OP-27	DAC-10	OP-14	OP-471	SW-201
AD536A	AD632	AD845	AD7522	AD9048	AD OP-37	DAC-100	OP-15	OP-490	SW-7510
AD537	AD637	AD846	AD7524	AD9005A	ADSP-1008A	DAC-312	OP-16	OP-497	SW-7511
AD538	AD639	AD847	AD7528	AD9006	ADSP-1009A	DAC-888	OP-17	PKD-01	
AD539	AD640	AD848	AD7533	AD9016	ADSP-1010A	DAC-1508	OP-20	PM-108	
AD542	AD642	AD849	AD7534	AD9020	ADSP-1010B	DAC-8012	OP-21	PM-111	
AD544	AD644	AD1332	AD7535	AD9028	ADSP-1012A	DAC-8043	OP-22	PM-119	
AD547	AD647	AD1334	AD7536	AD9038	ADSP-1016A	DAC-8143	OP-27	PM-139	
AD548	AD648	AD1341	AD7537	AD9058	ADSP-1024A	DAC-8212	OP-32	PM-148	
AD549	AD650	AD1362	AD7541 & A	AD9060	ADSP-1080A/81A	DAC-8221	OP-37	PM-155	
AD558	AD652	AD1378	AD7542	AD9300	ADSP-1101	DAC-8222	OP-41	PM-156	
AD561	AD664	AD2700	AD7543	AD9500	ADSP-1110A	DAC-8229	OP-42	PM-157	
AD562	AD667	AD2701	AD7545 & A	AD9501	ADSP-1401/10	DAC-8248	OP-43	PM-1008	
AD563	AD668	AD2702	AD7547	AD9610	ADSP-1402	DAC-8408	OP-44	PM-1012	
AD565A	AD670	AD3860	AD7548/49	AD9617	ADSP-2100 & A	DAC-8412	OP-50	PM-2108	
AD566A	AD673	AD5200 Series	AD7569	AD9618	ADSP-2101	DAC-8413	OP-61	PM-7224	
AD567	AD674A	AD5210 Series	AD7572	AD9630	ADSP-2111	DAC-8800	OP-64	PM-7226	
AD568	AD674B	AD5240	AD7574	AD9696	ADSP-3128A	HOS-050A/060SH	OP-77	PM-7524	
AD569	AD684	AD5539	AD7575	AD9698	ADSP-3201/02	HTC-0300A	OP-90	PM-7528	

Boldface indicates new MIL-STD-883 Class B Product availability since publication of our most recent Databooks. For status of specific parts, please contact your local salesperson. Due to the nature of slash sheet and MIL drawing development, the availability of parts is difficult to predict. This list will be updated and published in *Analog Briefings* every six months.



Military Products

JAN QPL Class B Products

JAN Part Number	Generic Part Number	Description
JM38510/14001BXA	AD574AUD	Complete, 12-Bit ADC
JM38510/14002BXA	AD574ATD	Complete, 12-Bit ADC
JM38510/12101BJC	AD562SD	12-Bit Current Output DAC
JM38510/12103BJC	AD565SD	12-Bit Current Output DAC
JM38510/12702BEC	AD7520UD	10-Bit Multiplying DAC
JM38510/13301BEA	AD561SD	10-Bit DAC, I-Out
38510/11302BEA	DAC08 AQ5	8-Bit D/A Converter
38510/11302BEB	DAC08 AQ2	8-Bit D/A Converter
38510/11301BEA	DAC08 Q5	8-Bit D/A Converter
38510/11301BEB	DAC08 Q2	8-Bit D/A Converter
JM38510/12801BGC, A	AD584SH	Multi-Tap Reference
JM38510/12802BGC, A	AD584TH	Multi-Tap Reference
JM38510/13901BIA	AD534TH	Analog Multiplier, Prog. Scale
JM38510/13901BCA	AD534TD	Analog Multiplier, Prog. Scale
JM38510/13902BCA	AD534SD	Analog Multiplier, Prog. Scale
JM38510/13902BIA	AD534SH	Analog Multiplier, Prog. Scale
JM38510/13903BIA	AD532SH	Analog Multiplier, Fixed Scale
JM38510/13903BCA	AD532SD	Analog Multiplier, Fixed Scale
38510/13501BGA	OP07 AJ5	Low Offset Op Amp
38510/13501BCG	OP07 AJ1	Low Offset Op Amp
38510/13501BPA	OP07 AZ5	Low Offset Op Amp
38510/13501BPB	OP07 AZ2	Low Offset Op Amp
38510/13502BGA	OP07 J5	Low Offset Op Amp
38510/13502BGC	OP07 J1	Low Offset Op Amp
38510/13502BPA	OP07 Z5	Low Offset Op Amp
38510/13502BPB	OP07 Z2	Low Offset Op Amp
38510/13503BGA	OP27 AJ5	Low Noise Precision Op Amp
38510/13503BGC	OP27 AJ1	Low Noise Precision Op Amp
38510/13503BPA	OP27 AZ5	Low Noise Precision Op Amp
38510/13503BPB	OP27 AZ2	Low Noise Precision Op Amp
38510/11404BGA	LF155/PM155 AJ5	BiFET Op Amp
38510/11404BGC	LF155/PM155 AJ1	BiFET Op Amp
38510/11404BPA	LF155/PM155 AZ5	BiFET Op Amp
38510/11404BPB	LF155/PM155 AZ2	BiFET Op Amp
38510/11401BGA	LF155/PM155 J5	BiFET Op Amp
38510/11401BGC	LF155/PM155 J1	BiFET Op Amp
38510/11401BPA	LF155/PM155 Z5	BiFET Op Amp
38510/11401BPB	LF155/PM155 Z2	BiFET Op Amp
38510/11405BGA	LF156/PM156 AJ5	BiFET Op Amp

JAN Part Number	Generic Part Number	Description
38510/11405BGC	LF156/PM156 AJ1	BiFET Op Amp
38510/11405BPA	LF156/PM156 AZ5	BiFET Op Amp
38510/11405BPB	LF156/PM156 AZ2	BiFET Op Amp
38510/11402BGA	LF156/PM156 J5	BiFET Op Amp
38510/11402BGC	LF156/PM156 J1	BiFET Op Amp
38510/11402BPA	LF156/PM156 Z5	BiFET Op Amp
38510/11402BPB	LF156/PM156 Z2	BiFET Op Amp
38510/11406BGA	LF157/PM157 AJ5	BiFET Op Amp
38510/11406BGC	LF157/PM157 AJ1	BiFET Op Amp
38510/11406BPA	LF157/PM157 AZ5	BiFET Op Amp
38510/11406BPB	LF157/PM157 AZ2	BiFET Op Amp
38510/11403BGA	LF157/PM157 J5	BiFET Op Amp
38510/11403BGC	LF157/PM157 J1	BiFET Op Amp
38510/11403BPA	LF157/PM157 Z5	BiFET Op Amp
38510/11403BPB	LF157/PM157 Z2	BiFET Op Amp
38510/11201BCB	LM139/PM157 Y2	Quad Low Power Voltage Comparator
38510/11201BCA	LM139/PM139 Y5	Quad Low Power Voltage Comparator
38510/10304BCA	LM111/PM111 Y5	Voltage Comparator
38510/10304BCB	LM111/PM111 Y2	Voltage Comparator
38510/10304BGA	LM111/PM111 J5	Voltage Comparator
38510/10101BGA	741A/PM741 AJ5	General Purpose Op Amp
38510/10101BCG	741A/PM741 AJ1	General Purpose Op Amp
38510/10104BGA	LM108/PM108 AJ5	Low Input-Current Op Amp
38510/10104BGC	LM108/PM108 AJ1	Low Input-Current Op Amp
38510/10104BPA	LM108/PM108 AZ5	Low Input-Current Op Amp
38510/10104BPB	LM108/PM108 AZ2	Low Input-Current Op Amp
38510/10106BEA	LH2108A/PM2108AQ5	Dual Op Amp
38510/10106BEB	LH2108A/PM2108AQ2	Dual Op Amp
38510/11004BCA	4136/PM4136 Y5	Quad Op Amp
38510/11004BCB	4136/PM4136 Y2	Quad Op Amp

Gold and tin reflow lead parts will be built to order only. Hot Solder dip is the preferred and stocked lead finish.

JAN QPL Class S Products

Precision Monolithics (PMI) and Analog Devices, Inc. (ADI) have combined resources and offer a full range of products with Class "S" processing:

- MIL-M-38510 QPL "S" reference SEC IV
- ADI will soon be offering the following part types in Class "S" conforming to MIL-STD-883, Para. 1.2.1:

Class "S"	Description
AD590	Monolithic Temperature Transducer
AD534	Precision Analog Multiplier
AD574	12-Bit Analog A/D Converter
AD584	10, 5, 2.5 Voltage Pin Programmable Precision Voltage Reference

- A Standard Class "S" Program has been developed offering Class "S" devices which fully satisfies the customer's needs for full process control, traceability, reliability, lot qualifications, certified line, and the recorded data generally associated with Class "S" processing. ADI Standard Class "S" processing is based on MIL-STD-883, Methods 5004 and 5005, Class "S" flow and can be applied to any SMD or 883 military part listed herein Sec I or Sec II. The electrical parameters and end-points for the ADI Standard Class "S" flow will be as described in the current PMI/ADI 883 data sheet catalog. The factory must be consulted for delta parameters and limits, burn-in circuit, methods, and anomalies for PDA information, until complete ADI Standard Class "S" specification sheets, by product, are available.

The newest additions to the Standard Class "S" are parts listed in Section I, II are the following:

2S80	Resolver to Digital Converter
AD9048	35 MSPS, Video 8-Bit A/D Converter, 550 mW
AD9002	150 MSPS, 8-Bit A/D Converter, ECL, 750 mW
AD9012	100 MSPS, 8-Bit A/D Converter, TTL, 1 W
AD9060	75 MSPS, 10-Bit A/D Converter

Additional devices will be added in 1992.

PMI Division will continue to offer Class "B" and Class "S" processing to Source Control Drawings (SCD) and is also capable of handling Radiation Testing requirements. The radiation data base information gathered from ADI/PMI devices will be managed and distributed by the PMI Division of ADI.

JAN Part Number	Generic Part Number	Description	Part I Qual
38510/13501SGA	OP07 AJ5	Low Offset Op Amp	Yes
38510/13501SPA	OP07 AZ5	Low Offset Op Amp	Yes
38510/13502SGA	OP07 J5	Low Offset Op Amp	Yes
38510/13502SPA	OP07 Z5	Low Offset Op Amp	Yes
38510/13503SGA	OP27 AJ5	Low Noise Precision Op Amp	Yes
38510/13503SPA	OP27 AZ5	Low Noise Precision Op Amp	Yes
38510/11404SGA	LF155/PM155 AJ5	BiFET Op Amp	Yes
38510/11404SPA	LF155/PM155 AZ5	BiFET Op Amp	Yes
38510/11401SGA	LF155/PM155 J5	BiFET Op Amp	Yes
38510/11401SPA	LF155/PM155 Z5	BiFET Op Amp	Yes
38510/11405SGA	LF156/PM156 AJ5	BiFET Op Amp	Yes
38510/11405SPA	LF156/PM156 AZ5	BiFET Op Amp	Yes
38510/11402SGA	LF156/PM156 J5	BiFET Op Amp	Yes
38510/11402SPA	LF156/PM156 Z5	BiFET Op Amp	Yes
38510/11201SEA	LM139/PM139 AY5	Quad Low Power Voltage Comp.	Yes
38510/10101SGA	741 A/PM741 AJ5	General Purpose Op Amp	Nov, 90
38510/10104SGA	LM108/PM108 AJ5	Low Input-Current Op Amp	Jan, 91
38510/11302SEA	DAC08 AQ5	8-Bit D/A Converter	Yes
38510/11301SEA	DAC08 Q5	8-Bit D/A Converter	Yes
38510/12208SGA	OP42 AJ5	High Speed Precision Op Amp	Q3, 91
38510/12208SPA	OP42 AZ5	High Speed Precision Op Amp	Q3, 91
38510/12207SGA	OP44 AJ5	High Speed Precision Op Amp	Q3, 91
38510/12207SPA	OP44 AZ5	High Speed Precision Op Amp	Q3, 91
38510/10304SGA	LM111/PM111 J5	Voltage Comparator	Q2, 91
38510/10304SPA	LM111/PM111 Z5	Voltage Comparator	Q2, 91
38510/135xxSPA**	OP200 AZ5	Dual Low Power/Offset Op Amp	Q3, 91
38510/135xxSCA**	OP400 AY5	Quad Low Power/Offset Op Amp	Q3, 91

**In the future, these parts may identified in the new DESC "One Part, One Part Number" system, i.e.,

Part Number	PMI Part Number
5962-8859301SPA	OP200 AZ5
5962-8777101SCA	OP400 AY5

Product Families Still Available

The information published in this Reference Manual is intended to assist the user in choosing components for the design of *new* equipment, using the most cost-effective products available from Analog Devices. The popular product types listed below may have been designed into your circuits in the past, but they are no longer likely to be the most economic choice for your new designs. Nevertheless, we recognize that it is often a wise choice to refrain from redesigning proven equipment, and we are continuing to make these products available for use in existing designs. Data sheets on these products are available upon request.

Model	Model	Model	Model	Model
AD101	AD5200 Series	DAC-20	RDC-1704	275
AD201	AD5210 Series	DAC71/72	RDC-1725	277
AD293	AD7110	DAC-86	RDC-1726	285
AD294	AD7240	DAC-88	RDC-1768	288
AD301	AD7520	DAC-89	RTM Series	310
AD301AL	AD7521	DAC-210	SDC1700	426
AD367	AD7522	DAC-888	SDC1702	429
AD368	AD7523	DAC1108	SDC1704	433
AD369	AD7525	DAC1136	SDC1725	434
AD370/371	AD7530	DAC1138	SDC1726	435
AD392	AD7531	DAC1146	SDC1768	436
AD503	AD7541	DAC-1408A	SHA-1144	440
AD504	AD7546	DAC1508A	SMP-81	442
AD506	AD7576	DAC-8212	STM Series	450
AD510	AD7772	DAS1128	SW-01/02	451
AD515	AD9502	DRC1705	SW-7510/7511 2B24	453
AD518	AD9611	DRC1706	2B34	458
AD533	AD9686	DSC1705	2B35	460
AD535	ADC-908	DSC1706	2B50	751
AD545	ADC-912	HDS-1240E	2B52	756
AD567	ADC1100	HDS-1250	2B53	903
AD611	ADC1130	HOS-050/050A/050C	2B56	915
AD651	ADC1131	HOS-060	2B57	947
AD689	ADC1143	HTC-0300A	2B58	950
AD1147	AD DAC-08	HTS-0010	2B59	951
AD1148	AD DAC71	HTS-0025	4B Series	952
AD1175	AD DAC72	JM38510/11301/11302	40	968
AD1403	ADEB770	MUX-88	44	972
AD2004	CAV-1210	PM-0820	50	973
AD2006	DAC-01	PM-562	171	
AD2016	DAC-02/03	PM-7541	184	
AD2020	DAC-05/06	PM-7574	234	
AD3554	DAC-12QS	RDC-1700	235	
AD3860	DAC-12QZ	RDC-1702	261	

Substitution Guide for Product Families No Longer Available

The products listed in the left-hand column are no longer available from Analog Devices. In many cases, comparable functions and performance may be obtained with newer models, but—as a rule—they are not directly interchangeable. The closest recommended Analog Devices equivalent, physically and electrically, is listed in the right-hand column. If no equivalent is listed, or for further information, contact your local sales office.

Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent
AD108/208/308	AD705	AD1508	AD558	AD9687	AD96686	CAV-1202	AD9005
AD108A/208A/308A	AD705	AD1678	AD678	AD9688	AD9002/AD9028	CAV-1205	AD9005
AD111/211/311	AD790	AD1679	AD679	AD ADC-816	AD7820/AD7821	CMP-01Z	CMP-01J
AD345	AD1321/1322	AD1779	AD779	ADC-8S	AD673	CMP-05BJ	CMP-05CJ
AD351	AD790	AD2003	AD2021	ADC-10Z	AD574A	CMP-05BZ	CMP-05CZ
AD362	AD1362	AD2008	None	ADC-12QL	AD7578	CMP-05GJ	CMP-05CJ
AD376	AD1376	AD2009	None	ADC-12QM	AD574A/AD674A	CMP-404BY	CMP-404AY
AD501	AD711	AD2022	None	ADC-12QZ	AD574A/AD674A	CMP-404BY/883C	CMP-404AY/883C
AD502	AD711	AD2023	None	ADC-141/171	AD1170	DAC-02ACX1	DAC-02CCX1
AD505	AD509	AD2024	None	ADC1102	AD7870	DAC-05AX1	DAC-02CCX1
AD508	AD517	AD2025	None	ADC1103	AD7572A	DAC-05EX1	DAC-02CCX1
AD511	AD711	AD2027	None	ADC1105	AD7550/AD7552	DAC-10BX	DAC-10FX
AD512	AD711	AD2028	None	ADC1109	AD7572A	DAC-10CX	DAC-10GX
AD513	AD711	AD2033	None	ADC1111	AD574A	DAC-10DF	AD568
AD514	AD711	AD2036	None	ADC1121	AD7880	DAC-10H	None
AD516	AD711	AD2037	None	ADC1123	AD7880	DAC-10Z	None
AD520	AD524	AD2038	None	ADC1133	AD574A	DAC-12M	AD7845
AD523	AD549	AD2040	None	ADC-QU	AD574A/AD674A	DAC-14QM	DAC1136
AD528	AD711/744	AD5010/6020	AD9000	AD DAC100	AD561	DAC-16QM	DAC1136
AD530	AD533	AD6012	AD565A	ADG200	None	DAC-100AAQ7	DAC-100ACQ7
AD531	AD532	AD7115	AD7111	ADG201	ADG201A	DAC-100AAQ8	DAC-100ACQ8
AD540	AD544	AD7513	ADG201A	ADLH0032G/CG	AD843	DAC-100ABQ7	DAC-100ACQ7
AD559	AD557/AD558	AD7516	AD7510DI	ADLH0033G/CG	AD9620/AD9630	DAC-100ABQ8	DAC-100ACQ8
AD565	AD565A	AD7519	None	ADM501	None	DAC-100BBQ5/883C	DAC-100ACQ5/883C
AD566	AD566A	AD7527	AD7548	ADP501	None	DAC-100BCQ7	DAC-100BBQ7
AD612	AD524	AD7544	AD7548	ADREF01	REF-01	DAC-100DDQ7	DAC-100CCQ7
AD614	AD524	AD7550	None	ADREF02	REF-02	DAC-312BR	DAC-312ER
AD801	AD711	AD7552	None	ADSHC-85	AD585	DAC-888AX	DAC-888EX
AD810-813	None	AD7555	AD1175K	ADSHM-5	HTC-0300A	DAC-888BX	DAC-888EX
AD814-816	None	AD7560	None	AMP-01BX	AMP-01AX	DAC1009	AD767
AD818	None	AD7570	AD7579/AD7580	AMP-01BX/883C	AMP-01AX/883C	DAC1106	AD568
AD820-822	None	AD7571	AD7579/AD7580	AMP-05BX	AMP-05AX	DAC1112	DAC12QS
AD830-833	None	AD7583	AD7880+ MUX	AMP-05BX/883C	AMP-05Z/883C	DAC1118	AD767
AD835-839	None	AD9011	AD9002	API1620/1718	Consult ADI	DAC1122	AD7541A
AD1145	AD7846	AD9521	AD640	BDM 1615/16/17	None	DAC1125	AD7533
AD1408	AD558	AD9615	AD9611/AD9617	BUF-03BJ/883C	BUF-03AJ/883C	DAC1132	AD667
		AD9685	AD96685	CAV-0920/1020	AD9020/9060		

Substitution Guide for Product Families No Longer Available

Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent
DAC-1408-6P	DAC-1408-8P	MAH-1001	AD9005	OP-08AZ/883C	PM-1008AZ/883C	PM-139AY	PM-139AY/883C
DAC-1408-7P	DAC-1408-8P	MAS-0801	AD9005	OP-08CZ/883C	PM-1008AZ/883C	PM-156AZ	PM-156AZ/883C
DAC-1408-7Q	DAC-1408-8Q	MAS-1001	AD9005	OP-08EJ	PM-1008EJ	PM-157J	PM-175J/883C
DAC-1408-GQ	DAC-1408-8Q	MAS-1202	AD9005	OP-08EZ	PM-1008EZ	PM-157J/883C	PM-157AJ/883C
DAC-1420	None	MAT-01/883C	MAT-01AH/883C	OP-09ARC/883C	OP-11ARC/883C	PM-208AJ	PM-108AJ/883C
DAC-1422	None	MAT-02BH	MAT-02AH	OP-09FY	OP-09EY	PM-208AZ	PM-108AZ
DAC-1423	None	MAT-02BH/883C	MAT-02AH/883C	OP-12BZ	OP-12AZ	PM-308AZ	PM-1008GZ
DAC-1508A-8Q	DAC-1408-8Q	MATV-0811	AD9012/48	OP-12CZ	OP-12AZ	PM-308J	PM-1008G
DAS-1150	AD368	MATV-0816	AD9012/48	OP-12GZ	OP-12FZ	PM-4136RC	OP-11ARC/883C
DAS-1151	AD369	MATV-0820	AD9012/48	OP-14DZ	OP-14CZ	PM-562AV	PM-562HV
DAS-1155	None	MCI-1794	AD2S80A/82A	OP-14GRBC	OP-14GBC	PM-562BV	PM-562HV
DAS-1156	None	MDA Family	AD9712A/13A	OP-14J/883C	OP-14AJ/883C	PM-562FV	PM-562HV
DRC1605/06	DRC1705/06; SDC1740	MDH Family	AD9712A/13A	OP-15BJ	OP-15AJ	PM-562GV	PM-562HV
DRC1765/66	AD2S65/66	MDMS Family	AD9712A/13A	OP-15BZ	OP-15AZ	PM-741J	OP-02AJ
DSC1605/06	DSC1705/06; SDC1740	MDS Family	AD9712A/13A	OP-16BJ	OP-16AJ	RAC1763	None
DSC1765/66	AD2S65/66	MDSL Family	AD9712A/13A	OP-17BZ/883C	OP-17AZ/883C	RDC1602/03	RDC1702/03
DTM1716/17	AD2S65/66	MOD-1005/20	AD9020/60	OP-17CJ	OP-17AJ	RDC1711	None
HAS-0802	HAS1202A	MUX-08AQ	MUX-08BQ	OP-17FJ	OP-17EJ	RDC1721	AD2S46
HAS-1002	HAS1202A	MUX-24AQ	MUX-24EQ	OP-17FZ	OP-17EZ	RDC1767	RDC1768
HAS-1202	HAS1202A	MUX-24BQ	MUX-24FQ	OP-20CJ	OP-20BJ	RSCT1621	AD2S80A/82A
HDD-1015	AD9712A	MUX-16AT	MUX-16ET	OP-21GRBC	OP-21GBC	RTI-1200	RTI-711 Series
HDD-1409	None	MUX-16BT	MUX-16FT	OP-215BJ	OP-215AJ	RTI-1201	RTI-711 Series
HDG-0805	AD9701	OP-01HJ	OP-01J	OP-215BJ/883C	OP-215AJ/883C	RTI-1202	RTI-711 Series
HDH-0802	AD9713A	OP-01HZ	OP-01HP	OP-215BZ	OP-215AZ	RTM1630-34	RTM1680/83
HDH-1003	AD9713A	OP-02BJ	OP-02AJ	OP-215CZ/883C	OP-215BZ/883	RTM1636	Consult ADI
HDH-1205	AD9713A	OP-02BJ/883C	OP-02AJ/883C	OP-21BJ	OP-21AJ	RTM1660/63/71/72	Consult ADI
HDL-3805	ADV453/ADV478	OP-02EJ	OP-07DJ	OP-21BZ	OP-21AZ	RTM1679	None
HDL-3806	ADV453/ADV478	OP-02EP	OP-177GP	OP-21EJ	OP-21AJ	RTM1681/86/87/89	Consult ADI
HDM-1210	AD668/AD9713A	OP-02EZ	OP-177GZ	OP-220BJ	OP-220AJ	RTM1690/96	Consult ADI
HDS-0810E	AD9712A	OP-02J	OP-02AJ	OP-22AJ	OP-22AJ/883C	RTM1697	None
HDS-0820	AD9713A	OP-02/883C	OP-02AZ/883C	OP-22EJ	OP-22AJ/883C	RTM1736/37	RDC1740 + CCT
HDS-1015E	AD9712A	OP-04DY	OP-04CY	OP-32BZ	OP-32AZ	SAC1763	None
HDS-1025	AD9713A	OP-04GBC	OP-04NBC	OP-32BZ/883C	OP-32AZ/883C	SBCD1752/53/56/57	None
HOS-100AH/SH	None	OP-04Y/883C	OP-04AY/883C	OP-32FZ	OP-32EZ	SCDX1623	None
HOS-200	AD9620/30	OP-05Z	OP-05AZ	OP-50BY	OP-50AY	SCM1677	None
HTC-0300	HTC-0300A	OP-05/883C	OP-05AZ/883C	OP-50BY/883C	OP-50AY/883C	SDC1602/3/4	SDC1702/03/04/40
HTC-0500	HTC-0300A	OP-06BJ/883C	OP-06AJ/883C	OSC-1754	OSC-1758	SDC1711	None
IPA-1751	IPA-1764	OP-06EZ	OP-06GZ	PKD-01BY	PKD-01AY	SDC1721	AD2S46
IRDC1730-33	AD2S80A/82A	OP-06FZ	OP-06GZ	PKD-01BY/883C	PKD-01AY/883C	SDC1767	SDC1768
MAH-0801	AD9005	OP-08AJ	PM-1008AJ	PM-111Y	PM-111J	SERDEX	µMAC-5000
		OP-08AJ/883C	PM-1008AJ/883C	PM-111Y/883C	PM-111J/883C	SHA-1A	AD585



Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent	Model	Closest Recommended Equivalent
SHA-2A	AD781	1S61	1S60; AD2S80A/82A	163	None	454	AD537
SHA-3	AD585	2S20	AD2S80A/82A	165	None	456	AD537
SHA-4	AD585	5S70/5S72	AD2S75	170	None	602J10	AD524
SHA-5	None	9S70/71/72	None	180	AD OP-07	602J100	AD524
SHA-6	AD1154	9S75/76/79	None	183	184	602K100	AD524
SHA1114	AD585	41	AD515A	220	234	603	AD524
SHA-1134	None	42	AD549	230	235	605	AD524
SMP-10BY	SMP-10AY	43	AD549	231	235	606	AD625
SMP-10BY/883C	SMP-10AY/883C	45	AD744	232	235	610	AD625
SPA-1695	None	46	50	233	None	752	759
SSCT1621	AD2S80A/82A	47	AD845	260	AD707	901	904
SSCT1622/23	None	48	AD845	272	None	906	905
STM1630-34	STM1680/83	51	AD844	273	None	907	921
STM1636	Consult ADI	52	AD707	276	None	908	921
STM1660/63/71/72	Consult ADI	102	AD845	274J	284J	909	921
STM1679	None	106	AD711	279	286J	926	927
STM1681/86/87/89	Consult ADI	107	AD711	280	281	931	None
STM1690/96	Consult ADI	108	AD845	282J	292A	932	None
STM1697	None	110	AD845	283J	292A	933	None
STM1736/37	SDC1740 + CCT	118	AD711	287	None	935	None
SW-01BQ	SW-01FQ	120	50	301	310 (Module)	942	None
SW-7510AQ	SW-7510EQ	141	40	302	310 (Module)	944	None
SW-7510BQ	SW-7510FQ	142	AD845	311	AD549	946	None
SW-7511AQ	SW-1577BQ	143	AD845	350	None	948	947
THC-Family	HTC-0300A	146	AD382	424	435/AD534	956	None
THS-Family	HTC-0300A	148	AD549	427	None	959	960
TSL1612	Consult ADI	149	50	428	AD538	971	921
1S10/20	1S40; AD2S80A/82A	153	AD517	432	None		
1S14/24/44/64	1S74	161	None	452	None		

Analog Devices provides a wide array of FREE technical publications. These include Data Sheets, Catalogs, Application Notes and Guides and four serial publications: *Analog Productlog*, a digest of new-production information; *DSPatch™*, a newsletter about digital signal-processing (applications); *Analog Briefings®*, current information about products for military/avionics and the status of reliability at ADI; and *Analog Dialogue*, our technical magazine, with in-depth discussions of products, technologies and applications.

In addition to the free publications, a group of technical reference books are available at reasonable cost. Subsystem products are supported with hardware, software, and user documentation, at prices related to content.

Brief descriptions of typical publications appear below. For copies of any items, to subscribe to any of our free serials or to request any other publications, please get in touch with Analog Devices or the nearest sales office.

CATALOGS

Data Acquisition Products Databooks. Contain selection guides, data sheets and other useful information about all Analog Devices ICs, hybrids, modules and subsystem components recommended for new designs. The current series consists of:

DATA CONVERTER REFERENCE MANUAL—1992: Volumes 1 and 2. Data sheets and selection guides on A/D and D/A Converters, V/F and F/V Converters, Synchro/Resolver-to-Digital Converters, Sample/Track-Hold Amplifiers, Switches and Multiplexers, Voltage References, Data-Acquisition Subsystems, Analog I/O Ports, Communications Products, Bus Interface and I/O Products, Application-Specific ICs, Digital Panel Meters, Power Supplies. (Available FREE.)

LINEAR PRODUCTS DATABOOK—1990/1991. Data Sheets and Selection Guides on Op Amps, Instrumentation Amplifiers, Isolators, RMS-to-DC Converters, Multipliers/Dividers, Log/Antilog Amplifiers, Comparators, Temperature-Measuring Components and Transducers, Special Function Components, Digital Panel Instruments, Signal-Conditioning

Components and Subsystems, Mass Storage Components, ATE Components, Automotive Components, Bus Interface and Serial I/O Products, Application Specific ICs. (Available FREE.)

AUDIO/VIDEO REFERENCE MANUAL—SSM Audio Products from ADI's PMI Division: VCAs, Surround-Sound Decoder, Audio Preamplifiers, Audio Switches, Line Driver/Receiver, Audio Op Amps, Matched Transistors, Level Detection System, Voltage-Controlled Filters, Log Conversion Amplifier, Multiplexed Sample/Hold, plus 19 Application Notes.

MILITARY PRODUCTS DATABOOK—1990 (in two volumes) Information and data on products available with processing in accordance with MIL-STD-883.

Volume 2: PMI Division products—including Class S.
Volume 1: All other Analog Devices products.

DATA-ACQUISITION AND CONTROL CATALOG—1990. Tutorial and Configuration Guide, with Product Reference and Index. Bus-Compatible I/O Boards for: IBM PS/2,* IBM PC/XT/AT,* STD Bus, VME-bus, MULTIBUS.† Distributed I/O Subsystems—fixed-function front ends, programmable units, and distributed control systems. Modular Signal Conditioners—analog and digitizing. Analog Signal-Conditioning Panels—isolated and nonisolated. Digital Subsystems—16- and 24/32-channel. Software—DOS drivers and applications packages.

POWER SUPPLIES‡—Linear Supplies •DC-DC Converters. 12-page Short-Form Catalog listing AC/DC Power Supplies, Modular DC/DC Converters, Power-Supply Test Procedures, Transients, Thermal Derating, Mechanical Outlines of Packages and Sockets.

APPLICATION NOTES

Available individually upon request:

A/D Converters

“AD671 12-Bit, 2-MHz ADC Digitizes CCD Outputs for Imaging Applications” [E1455]
“AD7672 Converter Delivers 12-Bit 200-kHz Sampling Systems” [E1313]
“Asynchronous Clock Interfacing with the AD7878” [E1334]

“Bipolar Operations with the AD7572” [E1010]
“Evaluation Board for the AD7701/AD7703 Sigma-Delta A/D Converters” [E1483]
“FIFO Operation and Boundary Conditions in the AD1332 and AD1334” [E1355]
“How to Obtain the Best Performance from the AD7572” [E1038]
“Implement Infinite Sample-and-Hold Circuits Using Analog Input/Output Ports” [E1359]
“Simple Circuit Provides Ratiometric Reference Levels for AD782X Family of Half-Flash ADCs” [E1412]
“Simultaneous and Independent Sampling of Analog Signals with the AD1334” [E1358]
“The AD7574 Analog-to-Microprocessor Interface” [E694]
“Using Multiple AD1334s in Many-Channel Synchronous Sampling Applications” [E1435]

Amplifiers

“A Balanced-Input High-Level Amplifier” [AN-112]
“Active Feedback Improves Amplifier Phase Accuracy” [AN-107]
“AD9617/AD9618 Current-Feedback Amplifier Macro-Models” [E1460]
“An IC Amplifier User's Guide to Decoupling, Grounding, and Making Things Go Right for a Change” [AN-202]
“An Ultralow-Noise Preamplifier” [AN-136]
“An Unbalanced Virtual-Ground Summing Amplifier” [AN-113]
“Applications of High-Performance BiFET Op Amps” [E727]
“CMOS DACs and Operational Amplifiers Combine to Build Programmable-Gain Amplifiers” (in 2 parts: I and II) [E1073A and E1110]
“How to Test Basic Operational Amplifier Parameters” [AN-201]
“JFET-Input Amps Are Unrivalled for Speed and Accuracy” [AN-108]
“Low-Cost Two-Chip Voltage-Controlled Amplifier and Video Switch” (AD539) [AN-213]
“Using the AD9610 Transimpedance Amplifier” [E1097]

"Very Low-Noise Operational Amplifier" (OP-27) [AN-102]

Analog Signal-Processing and Measurement

"A Function Generator and Linearization Circuit Using the AD7569" [E1369]

"Precision Surface Measurements Using the AD2S58" [E1486]

"RMS-to-DC Converters Ease Measurement Tasks" [E1519]

"Understanding and Applying the AD7341/AD7371 Switched-Capacitor Filters" [E1373]

Audio

"A Balanced Mute Circuit for Audio Mixing Consoles" [AN-122]

"A Constant-Power 'Pan' Control Circuit for Microphone Audio Mixing" [AN-123]

"A High-Performance Comband for Wireless Audio Systems" [AN-133]

"An Automatic Microphone Mixer" [AN-134]

"An Ultralow Noise Preamplifier" [AN-136]

"A Precision Sum and Difference (Audio Matrix) Circuit" [AN-129]

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